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ABSTRACT

This document is one of five publications in the Case Study Project, a component of the Third International Mathematics and Science Study (TIMSS). The Project was designed to provide in-depth information about education at the 4th, 8th, and 12th grade level in Germany, Japan, and the United States. Four research topics, selected by the U.S. Department of Education, provided the focus of each case study: (1) education standards; (2) dealing with differences in ability; (3) the place of school in adolescents' lives; and (4) the training and working conditions of teachers. The Project used sample data from demographically comparable cities in each country. The primary sites were large metropolitan areas with populations of several million, while the secondary sites had populations of at least several hundred thousand. An effort was made to select a range of primary and secondary schools. The Project augments the extensive interviews, discussions, and classroom observations that were conducted in the TIMSS case studies in the 1994-1995 academic year (Germany (n=199), over 366 hours of interviews; Japan (n=247), over 494 hours of interviews; and the United States (n=271), over 542 hours of interviews). The study found there are both commonalities and differences in the research topics among the three countries. The relationship between establishing and enforcing national guidelines varies greatly. What ought to be included in the national standards remains unclear. Consideration of individual differences in academic ability leads to an examination of a society's fundamental beliefs about human development along with the priority given to the individual relative to the group. School plays a central role in the lives of adolescents but they are increasingly influenced by the adult world they are about to enter. Teachers find the heightened emphasis on examinations to be among the most troublesome demands currently made of educators. Tentative suggestions and recommendations for further research are offered. Contains 25 references, a glossary, 2 figures, and 13 tables. (BT)

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To Sum It Up: Case Studies of Education in Germany, Japan, and the United States.

Harold W. Stevenson
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Curriculum, and Assessment (OERI/ED),
Washington, DC.

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Harold W. Stevenson and Roberta Nerison-Low

National Institute on Student Achievement, Curriculum, and Assessment
Office of Educational Research and Improvement
U.S. Department of Education

Contents

EXECUTIVE SUMMARY **1**

CHAPTER 1 .... **3**

INTRODUCTION 3
Rationale of the Study *3*
Background Information *4*
The Major Topics *5*
The Research Method *5*
Locations *6*
Researchers *8*
The Research Questions *9*
The Data *10*
Summary *10*

CHAPTER 2 .... **12**

EDUCATION STANDARDS 12
Public Education Systems *13*
Organization of Schools *14*
National Governments and Education Standards *16*
States, Prefectures, and Districts *18*
The Academic Curriculum *20*
Implementing the Curriculum *28*
Evaluating Achievement *30*
Differences Among Schools *32*
Standards in the Classroom *36*
Entrance Examinations *40*
Equity of Education *45*
Summary *48*

CHAPTER 3 .... **50**

DEALING WITH DIFFERENCES IN ACADEMIC ABILITY 50
Perception of Differences in Ability *53*
Dealing with Differences in Ability in Japan *55*
Dealing with Differences in Ability in Germany *58*
Dealing with Differences in Ability in the United States *59*
Gender and Tracking *62*
Race and Tracking *64*
Socioeconomic Status *66*
Students with Disabilities *68*
Gifted Students *70*
Summary *73*

CHAPTER 4 .... **77**

THE PLACE OF SCHOOL IN ADOLESCENTS' LIVES 77
Time Use *79*
Extracurricular Activities *81*
Out-of-school Instruction *83*
After-school Recreational Activities *84*
Homework *85*

Out-of-School Social Life *89*
Employment *91*
Time with Family *93*
Response to Education *95*
Transition from High School to Work *99*
Parental Influences on Adolescents *102*
Peer Influences *104*
Social Context *106*
Summary *108*

CHAPTER 5 .... **112**

THE TRAINING AND DAILY LIVES OF TEACHERS 112
Becoming a Teacher *115*
Attitudes about Being a Teacher *121*
A Teachers' Day *125*
Teaching Practices *131*
School Administration *135*
Summary *138*

CHAPTER 6 .... **142**

CONCLUSIONS 142
The Research Method *142*
Concluding Remarks *143*

REFERENCES **144**

GLOSSARY **147**

Figures

FIGURE 1—LOCUS OF CURRICULUM DEVELOPMENT AND CONTROL 14
FIGURE 2—ORGANIZATION OF SCHOOLS 16

Tables

TABLE 1—STANDARD NUMBER OF SCHOOL HOURS IN JAPANESE ELEMENTARY SCHOOLS 21
(IMPLEMENTED IN APRIL, 1992) 21
TABLE 2—NUMBER OF SCHOOL PERIODS PER YEAR IN JAPANESE JUNIOR HIGH SCHOOLS 22
TABLE 3—SUBJECTS REQUIRED OF ALL JAPANESE HIGH SCHOOL STUDENTS 23
TABLE 4—EXAMPLE FROM ONE GERMAN STATE: PERIODS OF MATH INSTRUCTION PER WEEK IN VARIOUS TRACKS AT THE THREE SCHOOL TYPES 25
TABLE 5—EXAMPLE OF ONE STATE'S RECOMMENDED HOURS OF INSTRUCTION TIME EACH WEEK FOR SUBJECTS AT THE THIRD GRADE IN THE UNITED STATES 27
TABLE 6—EXAMINATIONS REQUIRED OF ACADEMIC TRACK HIGH SCHOOL STUDENTS 41
TABLE 7—EXAMINATIONS REQUIRED OF VOCATIONAL TRACK STUDENTS 42
TABLE 8—INSTRUCTION OF MATH AND SCIENCE CURRICULA AT GRADES 4, 8, AND 12 52
TABLE 9—HOMEWORK 87
TABLE 10—TEACHERS' COMPENSATION PACKAGES 114
TABLE 11—COMPARISON OF TEACHER TRAINING REQUIREMENTS 115
TABLE 12—FACTORS INDICATING DESIRABILITY OF TEACHING PROFESSION 121
TABLE 13—TEACHERS' TYPICAL USE OF TIME 126

Executive Summary

The Case Study Project is a component of the Third International Mathematics and Science Study (TIMSS), and this volume—*To Sum It Up*—is one of five publications in the Case Study Project.[1] The Project was designed to provide in-depth information on education in three nations: Germany, Japan, and the United States. The four research topics which were the focus of the case studies in each of these countries were selected by the U.S. Department of Education in an effort to collect qualitative data which would complement and amplify the quantitative information obtained through the main Third International Mathematics and Science Study. The topics investigated in the Case study Project were: education standards, dealing with differences in ability, the place of school in adolescents' lives, and the training and working conditions of teachers.

The purpose in conducting the case studies was to describe the education processes that exist in a sample of cities in each of the three countries. The goal was to select research sites that were as comparable as possible among the three countries in terms of such factors as size, geographic distribution, and economic base. The primary sites where most of the data were collected were large metropolitan areas with populations of several million persons, while the socondary sites had populations of at least several hundred thousand. Within each site an effort was made to select a range of primary and secondary schools that represented successful, average, and less successful schools, in terms of such indices as scores on achievement tests, scores on college or high school entrance tests, and percentages of students entering colleges or universities.

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[1] *To Sum It Up: Case Studies of Education in Germany, Japan, and the United States*, is available electronically through the Web site of the National Institute on Student Achievement, Curriculum, and Assessment (http://www.ed.gov/offices/OERI/SAI) and not as a bound book.

Extensive interviews, discussions, and classroom observations were conducted in the TIMSS case studies in 1994-1995 to provide needed information about how three industrialized countries cope with several critical issues in education. In Germany, over 366 hours of interviews were conducted with 199 parents, teachers, students, principals, counselors, and assistant principals. A total of over 494 hours of interviews were held in Japan, with 247 persons. In the United States, researchers conducted over 542 hours of interviews with 271 persons.

This volume reports the main findings about the education systems and the practices, attitudes, and beliefs of the participants in the education of primary and secondary students in the three countries. From the discussions and observations that were conducted, it is obvious that there are both remarkable commonalties and striking differences among the three countries in many aspects of education. This publication may offer tentative suggestions about ways in which we may gain a better understanding of the process of education in the United States, and of topics that merit further exploration and research.

Chapter 1

Introduction

Rationale of the Study

A primary goal of international comparative studies of achievement in mathematics and science is to evaluate the level of performance of students in different countries. An equally important goal is to attempt to understand the bases of differences that emerge. In prior international comparative studies conducted by the International Association for the Evaluation of Educational Achievement (IEA), knowledge of mathematics and science was measured by paper-and-pencil tests, and efforts to understand cross-national differences in achievement were made through questionnaires given to teachers. These methods also constituted the primary means for gathering data for IEA's Third International Mathematics and Science Study (TIMSS). Again, questionnaires were given to teachers and additional data were gathered through questionnaires given to students, parents, and experts in mathematics and science education.

As is the case with all methods used for the collection of behavioral and attitudinal data, questionnaires have both strengths and weaknesses. They are the obvious choice when it is necessary to collect large amounts of data on an array of topics at the least expense. But interpretation of data from questionnaires is often more difficult than when there is an opportunity to interact with the respondents and to probe for details or elaboration of answers, as is possible with case studies.

Case studies, which involve observations, long conversations, and interviews, are time-consuming, require highly trained examiners, and are necessarily more expensive than questionnaire studies. Even so, the ethnographic methods employed in case studies help us to understand the context and relationships that lie behind quantitative data. Case studies are especially useful in research involving international comparisons, for it is in this type of research that the need for bridging the perspectives of insider and outsider is greatest.

The advantages of including ethnographic studies as a component of international comparative research in education has been described succinctly in a publication of the Board on International Comparative Studies in Education:

> There is a great need for small, in-depth studies of local situations that would permit cross-cultural comparisons capable of identifying the myriad of causal variables that are not recognized in large-scale surveys. In fact, much survey data would remain difficult to interpret and explain without the deep understanding of society that other kinds of studies provide. Given that research in cross-national contexts benefits from increased documentation of related contextual information, it would be useful to combine large-scale surveys and qualitative methods. (Gilford, 1993 p. 22)

In line with these arguments, a Case Study Project was included as part of TIMSS to provide in-depth information about the beliefs, attitudes, and practices of students, parents, and teachers that complements and amplifies the information obtained through the TIMSS questionnaires. The case studies involved interviews, conversations, and classroom observations in three countries: the United States and two of its leading economic competitors, Germany and Japan.

Background Information

Before embarking on a project as complex and expensive as case studies of the process of education in three countries, we tried to become familiar with relevant background information. Government and lay publications provided helpful descriptions of the school systems, and a review of the relevant German, Japanese, and American literature dealing with the correlates of academic achievement yielded additional information. This review is available as one of the TIMSS publications (Stevenson, Lee, & Nerison-Low, Eds. 1998).

The Major Topics

Even though we originally planned to have at least four researchers spend a year obtaining the case study data, it was obviously impossible for them to cover all aspects of education, including all grades and the full array of relevant topics. We limited ourselves, therefore, to grades 4, 8, and 12, which approximated the grade levels covered in the TIMSS study, grades 3–4, 7–8, and the end of schooling, and to four topics which were proposed by the U.S. Department of Education because of their importance in current discussions of education policy. The topics were

- education standards,
- dealing with differences in ability,
- the place of school in adolescents' lives, and
- the training and working conditions of teachers.

In order to help the reader understand the structure of the educational systems in the three countries, a brief description of these systems also is included.

The Research Method

When a case study involves only a single individual or a single setting it is difficult to evaluate the degree to which the results constitute a valid indication of what may exist beyond the individual setting. We believed it was necessary, therefore, not only to conduct the study in different locations within each country but also to include different schools within each location. It was also necessary to seek the participation of a reasonably large sample of individuals within each of the locations. Replication across individuals provides the basis for making claims of external validity, for replications demonstrate the resilience of explanations in both similar and dissimilar settings. We realize from the beginning, however, that our descriptions and discussions are derived from the beliefs, attitudes, opinions, and experiences expressed by the persons with whom we interacted or observed.

In order to interpret our findings it is important to understand how the case studies were conducted. The most important elements are described in the following paragraphs, and detailed descriptions are available in the volumes written about each country (Ashwill & Nerison-Low 1998; Hofer 1998; LeTendre 1998).

Locations

Because what occurs in schools and families often differs from one region of a country to another, three locations considered to be prototypic were selected after long discussions with representatives from each country. Our goal was to select research sites that were as comparable as possible among the three countries in terms of such factors as size, geographic distribution, and economic base. Because logistical problems make it very difficult to arrange for work in rural communities, the primary sites where most of the data were collected were large metropolitan areas with populations of several million persons that also provided ready access to smaller nearby communities. In addition to the primary site in each country, two secondary sites also were selected. All sites were located in different regions of each country: East, Central, and West in the United States; East, Central, and Southwest in Germany; and North, Central, and South in Japan. The secondary sites were smaller than the primary sites but had populations of at least several hundred thousand.

We selected schools at each site in consultation with local education authorities. Within each site an effort was made to select a range of primary and secondary schools that represented successful, average, and less successful schools in terms of such indices as scores on achievement tests, scores on college or high school entrance tests, and percentage of students entering colleges or universities. To select parents within each classroom we relied on school personnel, mainly the principal and teachers, to advise us about which families to approach in order to obtain representative groups of families to include in our study.

It is useful to indicate the extensiveness of our work. In Germany, we conducted over 366 hours of interviews with 199 parents, teachers, students, principals, counselors, and assistant principals. A total of over 494 hours of interviews were held in Japan with 247 persons. In the United States, we conducted over 542 hours of interviews with 271 persons. In addition, discussions were held with members of the national ministries of education in Bonn and Tokyo, and with staff members of Japan's National Institute of Educational Research. These discussions helped us to understand the organization and operation of the respective nation's schools and the kinds of policy issues of special concern to the respective governments. Supplementing the interviews and conversations were 255 hours of observations of science and mathematics classes in the three countries.

In addition to the core information derived from the interviews and observations of classroom practices, researchers were expected to take advantage of special opportunities as they arose. They were instructed, whenever possible, to observe school activities, such as PTA meetings, lunch hours, teachers' meetings, in-service training sessions, extracurricular activities, and sports day. They were also expected, to the degree possible, to collect samples of in-class tests and daily assignments, report cards, art products, writing samples, magazines for children and teenagers, and other materials relevant to gaining an understanding of background factors that may play a role in students' education. Descriptions of these events and materials were circulated among the researchers through computer notes in a three-country computer network.

Transcripts of these interviews, conversations, and observations gave us the information needed to describe many of the cultural and contextual factors related to academic achievement in the three societies. Obviously, only a portion of these data can be described in this general overview of the findings. Full descriptions of the findings appear in the volumes written about each of the three countries (Ashwill & Nerison-Low 1998; Hofer 1998; LeTendre 1998).

Researchers

Identifying the researchers who would be primarily responsible for conducting the case studies was a major task. In addition to being fluent in German, Japanese, or English, they were required to have resided previously in the country where they would be conducting research. They were also required to have a background in education or the social sciences, experience in using ethnographic methods, and the time available to spend several months in residence at the research sites.

We were successful in recruiting an exceptionally able and experienced group of researchers. Most researchers had a Ph.D. and had conducted their dissertation research in the country to which they were assigned for the case study. All of the researchers were born in the United States, with two exceptions. One researcher in Germany and one in Japan were native speakers of German and of Japanese who had attended schools in the United States. In addition to the full-time researchers who spent 2 or 3 months in the field, interviews and observations in the United States also were made by other staff members, including Hispanic American, an African-American, and several other native-born Americans. We also invited a Japanese psychologist to accompany the researchers in the major American site for 1 month in order for us to gain his perspective on what was observed. As a result of these procedures, a total of 19 persons served as researchers in various parts of this study.

The researchers in each country spent between 2 and 3 months at the major research site and were responsible for covering one of the four topic areas. Shorter periods (approximately 2 weeks) were spent at the secondary research sites by two of the full-time researchers in each country. Because of the shortness of the visits it was necessary for the researchers visiting the secondary sites to cover more than a single topic and to have a smaller number of contacts with students, parents, teachers, and education authorities.

To ensure comparability in the three countries, a week-long meeting was held to discuss the structure and procedures of the study before the researchers began their fieldwork.

The Research Questions

Our purpose in conducting the case studies was to describe the education processes that exist in a sample of cities in each of the three countries. We did not attempt to test any particular theory or set of hypotheses. Rather, the interviews, observations, and conversations provide needed information about how three industrialized countries cope with several critical issues in education. To be sure that relevant topics would be included, we spent several months compiling lists of questions and topics that each researcher was expected to explore during the fieldwork. Our own earlier research in the three countries provided us with a great deal of information that was helpful in defining specific topics for exploration (e.g., Stevenson & Lee 1990; Stevenson, Chen, & Lee 1993). Rather than rely solely on our own ideas, however, meetings were held with specialists in education from each country to ensure that the coverage would be appropriate, comprehensive, useful, and up to date. Participants in these meetings included policymakers, researchers, educators, and representatives of national groups, such as those concerned with education, science, and mathematics.

The Data

Researchers were not expected to follow any particular order in gaining information, but were expected to let the interactions flow naturally. All interviews were tape recorded, and in the case of Japanese and German were translated into English. The transcriptions were then entered into the computer. Verbatim notes from the classroom observations also were stored in the computer.

Compiling computer files that represent the thousands of sheets of paper necessary for recording the observations and interviews is a critical step, but the usefulness of files depends on the ease with which information can be retrieved. By having information readily available in an organized fashion it is possible to establish trends with much greater confidence than if every general statement required a new review of all of the field notes. Moreover, illustrating particular points by reference to especially vivid or characteristic examples can be accomplished much more readily through computer files than through field notes.

Computer programs exist for the analysis of ethnographic data if key words are supplied. To make easy retrieval possible, a list of key words was assigned to each topic prior to the beginning of fieldwork. These lists were based on the items in the questionnaires and on the researchers' knowledge of the three cultures in which they would be working. Each list was developed by the field researchers assigned to investigate the same research topic. For example, the field researchers dealing with individual differences agreed upon approximately 30 key words for the material related to teachers' responses to individual differences.

Summary

The case studies involved interviews, conversations, and classroom observations in grades 4, 8, and 12 in three metropolitan areas in Germany, Japan, and the United States. The majority of the interviews were held with pupils, teachers, and parents, but also with policymakers, education authorities, and other persons engaged in the education enterprise. A computer network linked all of the researchers and made it possible to enter and retrieve verbatim transcripts, observational records, and other field notes — the data on which the study is based.

Chapter 2

Education Standards

"They (standards) have to be there, especially for the inner city. Not everyone is highly motivated to perhaps take that difficult child and bring him to a certain level. Those situations need national standards. They have to be sure that they're met. We need standards so that children are not cheated because of their environment."

(Parent in the United States)

"All schools are supposed to give children an equal education. That is, all the *Gymnasien* should be equal in quality; all the *Hauptschulen* should be equal in quality according to their own standards."

(Teacher in Germany)

"Japan is a small country and when someone moves out of a prefecture or city, he or she does not need to worry about going to a different prefecture or city and having to fulfill a different set of standards."

(Teacher in Japan)

"The object of the curriculum [at the high school level] is to give everyone exposure to the curriculum, not to demand that they have to achieve up to a certain level. I think that every school adjusts what it teaches according to the level of the school. There are schools that do a whole lot of the curriculum and there are schools that only do the simple problems."

(Two teachers in Japan)

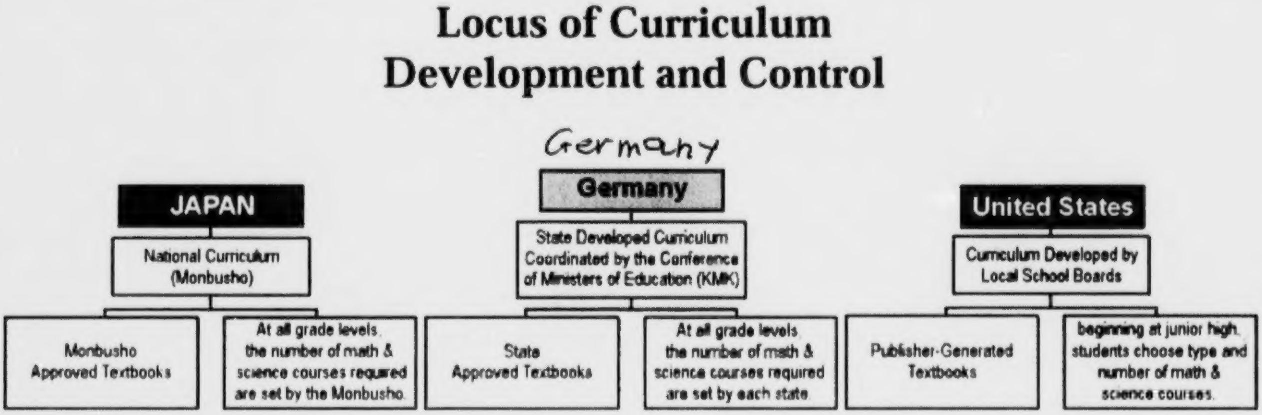
We begin our discussion of the results with the topic that is the most fundamental, but also perhaps the most complex of the four we investigated: education standards. It is difficult to gain a shared idea of what is meant by education standards for there is always the question of what to include. Decisions inevitably must be made about the relation of standards to guidelines, the evaluation of adherence to standards, the universal versus selective application of standards, the consequences of failing to meet standards, and many other important but complicated questions.

A brief review of the organization and structure of the education systems in all three countries provides helpful background information. Without this information it is difficult to evaluate the status and influence of education standards on a country's schools. Although most readers have personal familiarity with what exists in the United States, Americans generally have little information about the contemporary education systems of Japan and Germany.

Public Education Systems

The major dimension of difference among the three education systems is the degree to which control and support of schools is placed in the hands of the central, versus regional or local governments (see figure 1). Japan lies at one end of the continuum and the United States at the other, with Germany in between. Such matters as age of starting school, dominance of public versus private schools, years of compulsory education, and organization of schools into elementary, middle, and high schools do not differ greatly among the three countries. However, the Ministry of Education (*Monbusho*) of the Japanese central government maintains close supervision and provides significant financial support for schools in Japan. In Germany, a great deal of control is given to the states, but at the same time, a national coordinating agency, the Conference of Ministers of Education, attempts to ensure a high degree of comparability in the education systems of the various states. As a coordinating agency, the Conference can only make recommendations. To gain legal status the recommendations must be enacted into law by the individual states. In the United States, major control and financial support of public schools is under the jurisdiction of state and local governments.

Figure 1—Locus of Curriculum Development and Control


Locus of Curriculum Development and Control
Germany
JAPAN
National Curriculum (Monbusho)
Monbusho Approved Textbooks
At all grade levels the number of math & science courses required are set by the Monbusho
Germany
State Developed Curriculum Coordinated by the Conference of Ministers of Education (KMK)
State Approved Textbooks
At all grade levels the number of math & science courses required are set by each state
United States
Curriculum Developed by Local School Boards
Publisher-Generated Textbooks
beginning at junior high students choose type and number of math & science courses.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–1995.

Organization of Schools

Japan. Public education in Japan consists of three levels: elementary (grades 1 through 6), middle (grades 7 through 9), and high school (grades 10 through 12). Attendance at elementary and middle schools is compulsory. At the end of the ninth grade, students take an entrance examination that determines the high schools they are qualified to enter (U.S. Department of Education 1987). Most students (75.7 percent) attend public schools, but students (24 percent) also attend private schools and a few nationally funded schools (Shimizu, Akao, Arai, Ito, Sato, & Yaosaka 1995).

Although students are free to leave school after completing the ninth grade, 96 percent continue their education through the high school years. About 26 percent of the students eventually enter a nonacademic track by enrolling in vocational or technical high schools, and a small number choose to work during

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the day and attend night courses offered by some public high schools. Correspondence and evening courses also are available to students who fail to find a place elsewhere in the system (*Monbusho* 1993).

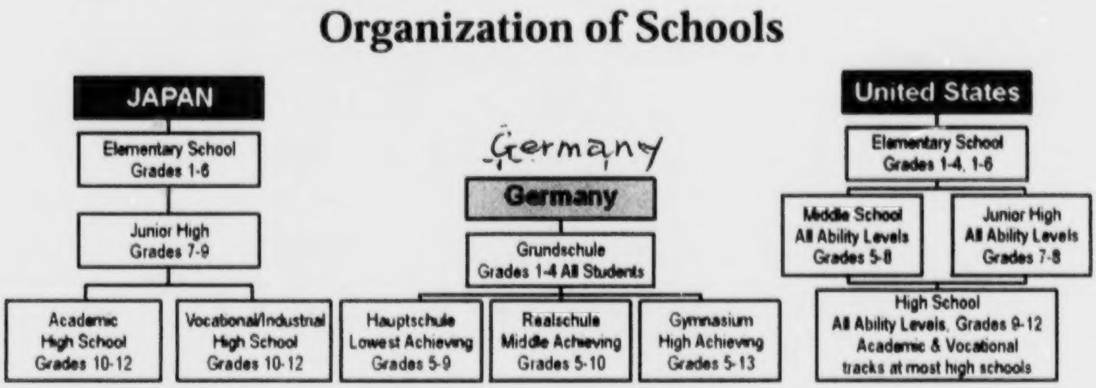
Germany. Beginning at age 6 and ending 4 years later, German children are enrolled in elementary school (*Grundschule*). In most states, students then transfer to one of three types of school: *Gymnasium* (for students who receive the highest grades during the 4 preceding years), *Realschule* (for students who receive average grades), and *Hauptschule* (for the least academically qualified students). In addition, some students attend a *Gesamtschule*, a comprehensive school which enrolls students of all ability levels. *Gesamtschule* have not, however, gained great popularity compared to the other three types of school (Conference of Ministers [KMK] 1993a; KMK 1993b).

The rigor and length of education differs among the three types of secondary schools. The German *Gymnasium*, which encompasses grades 5 through 13, has traditionally been considered the most academically rigorous of the secondary schools. The *Realschule*, which goes only through grade 10, emphasizes academic subjects, but covers them at a less theoretical level than occurs in the *Gymnasium*. *Hauptschule* students study the same primary academic subjects taught at *Gymnasium* and *Realschule*, but at a slower and more basic level. The *Hauptschule* typically enrolls students from grades 5 through 9, but some states require attendance through 10th grade. The organization of the schools in the three countries is depicted in figure 2.

United States. Students in the United States are expected to begin school by the age of 6 and enrollment is mandatory in most states until the age of 16. The remaining states require students to attend school until they are 17 or 18.

There is no uniform configuration throughout the country in the organization of primary and secondary education. Elementary school begins with kindergarten, but may continue through grades 5, 6, or 8, depending on decisions made at the local level. High school typically begins at grade 9 or 10, with middle or junior high schools usually covering the intervening years between elementary school and high school. Students graduate from high school following grade 12. In some locations, a single school may enroll students from kindergarten through grade 12.

Figure 2—Organization of Schools


Organization of Schools
JAPAN
Elementary School Grades 1-6
Junior High Grades 7-9
Academic High School Grades 10-12
Vocational/Industrial High School Grades 10-12
Germany
Germany
Grundschule Grades 1-4 All Students
Hauptschule Lowest Achieving Grades 5-9
Realschule Middle Achieving Grades 5-10
Gymnasium High Achieving Grades 5-13
United States
Elementary School Grades 1-4, 1-6
Middle School All Ability Levels Grades 5-8
Junior High All Ability Levels Grades 7-8
High School All Ability Levels, Grades 9-12 Academic & Vocational tracks at most high schools

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–1995.

National Governments and Education Standards

Japan. Control over education standards by the Japanese Ministry of Education is exerted in several ways. The Ministry develops national curricular guidelines that define the education standards. The Ministry revises the curricular guidelines every 10 years and is thereby able to be responsive to changes in national priorities concerning education. In addition to establishing the guidelines, the Ministry assumes further control of academic standards by certifying all textbooks used in schools, overseeing regional and national entrance examinations, and regulating the training of teachers.

No effort is made in devising the curricular guidelines to define exactly what should be taught. (The only exception concerns the *kanji* [Chinese characters] that are to be taught at each grade.) Rather, the guidelines consist of general descriptions of what students are expected to accomplish during each year of schooling. The time and manner in which the material is presented are decided by the school administration or by the individual teacher. Similarly, the content and design of textbooks are determined by private publishing companies. As long as the textbooks conform to the general guidelines, decisions about which textbooks will be adopted are made locally.

Information about revisions in *Monbusho's* curricular guidelines reaches the schools through inexpensive publications that are widely available and through workshops designed to inform schools of the changes in the curriculum. The guidelines, published as paperbacks, are used by teachers, schools, regional education authorities, and textbook publishers to develop curricular materials.

Germany. Established in 1948, the Conference of Ministers of Education is charged with overseeing the policies of all states within a framework of cultural sovereignty guaranteed by the German constitution. Through the Conference, the individual states coordinate the structures, institutions, curricula, and school-leaving certificates of the primary, secondary, and higher education systems. The result is that Germany has developed a set of de facto national standards that form the basis for a degree of comparability among the states. Even so, the autonomy of states to formulate policy based on these national standards has led to variability across the states.

United States. The United States Government has created no mechanism at the federal level for developing and enforcing uniform standards of education throughout the country. The closest the country has come to establishing national standards or guidelines occurred in 1989 when President George Bush and the 50 state governors agreed upon 6 national education goals to be achieved by the year 2000. Two more goals were added in 1994, and Congress codified these eight goals as the National Education Goals, with federal funds to be allocated through the Goals 2000: Educate America Act. A Goals Panel was established as an independent federal agency.

Even though the goals were considered to be national goals, funds were to be used to support meritorious plans developed by individual states rather than to support the state's adherence to federally defined criteria. State education standards included, in addition to content standards in core subjects, performance standards for students and standards related to the students' opportunities to learn. In other words, the content of the curricula, the academic achievement of students, and the opportunities provided to students were all considered to be part of national goals for education standards. The Goals Panel was given responsibility for many activities related to Goals 2000, ranging from building a consensus for reforms necessary to achieve improvement in education to monitoring and reporting progress toward the eight goals.

A national initiative concurrent with the Goals 2000 activities was the development of voluntary standards for mathematics, science, and history. Content standards in these and other areas have typically been proposed by professional societies, such as the National Council of Teachers of Mathematics. Funding has come from a variety of sources, including the U.S. Department of Education and various non-governmental organizations. Additional evidence of the public's acceptance of the value of national standards is apparent in the initiation of additional projects aimed at developing standards for the arts, geography, civics and government, and English and foreign languages.

States, Prefectures, and Districts

Complementing national efforts are activities taking place at the state and district levels. Even when an agency of the national government is primarily responsible for the development and implementation of standards, adjustments must sometimes be made by agencies at lower levels of government, such as by the prefectures (states) in Japan.

Japan. *Monbusho* policy allows schools and local boards of education to modify national curricular guidelines in ways that are considered to be more appropriate at the local level. Even so, our discussions with regional officials indicated that regional boards of education typically tended to interpret the *Monbusho* guidelines strictly, making few adjustments.

Monbusho also relies on regional and local boards of education to disseminate information about modifications in the guidelines published every decade. This is accomplished through *Monbusho*-sponsored workshops attended by representatives of regional boards of education and teachers. In turn, these participants conduct workshops for teachers in their own school districts.

Germany. All German states follow basically the same education structure and core curriculum, abide by uniform requirements for the school-leaving examination (*Abitur*) for *Gymnasium* students, and recognize the credentials certifying completion of school. Because implementation of the laws and regulations governing education is in the hands of each state's Ministry of Education, it is the state rather than a national Ministry that possesses the authority to develop and enforce curricular guidelines. These guidelines generally describe the required number of units for students, and the objectives, content, and periods of instruction.

United States. Most U.S. states have curriculum guidelines to assist schools and school districts in providing academic standards in four core academic subjects: English, mathematics, science, and social studies. Initiatives also have been proposed by local school boards and administrators to help schools reach the national goals of Goals 2000. Even as state guidelines and voluntary national standards have influenced school curricula, there has been a concurrent emphasis on the return of decision-making powers from the district to the school level. As a result, the introduction of local and district efforts to improve the academic environment and raise achievement levels has led to the development of many diverse programs.

The Academic Curriculum

There is an interplay in each of the three countries between school, district, state, and national government in the creation of the curriculum followed in each classroom. Even in Japan, with its central control of education, teachers and school districts are permitted to develop their own curricula, as long as they fall within the *Monbusho* guidelines. Although some teachers, especially in the United States, assume responsibility for their own curriculum, the demands in terms of time and effort for doing this are so great that the possibilities are seldom realized. Instead, individual teachers or individual schools are likely to adopt the curriculum developed by the municipal board of education.

Japan. The *Monbusho* curriculum guidelines spell out the required number of hours to be devoted to the 50-minute instructional hours at each grade level. It is obvious from tables 1 and 2 that the curriculum consists of a balance between academic and nonacademic subjects, with at least a third of the time at school being spent on subjects such as music, arts and crafts, homemaking, physical education, and special activities such as school clubs. A new subject, life activities, appeared in the elementary school curriculum implemented in 1992 (see table 1). It was introduced in an effort to provide information and experiences closely related to activities and events in the everyday world.

Table 1—Standard number of school hours in Japanese elementary schools (implemented in April, 1992)

Subjects	Grade					
	1	2	3	4	5	6
Japanese language	306	315	280	280	210	210
Life activities	102	105	105	105	105	105
Arithmetic	136	175	175	175	175	175
Science	—	—	105	105	105	105
Music, arts & handicrafts, and homemaking	136	140	140	140	210	210
Physical education	102	105	105	105	105	105
Moral education	34	35	35	35	35	35
Special activities	34	35	35	70	70	70
Total	850	910	980	1,015	1,015	1,015

SOURCE: Adapted from Jichi Sogo Center. (1991). *Education system in Japan.* Tokyo: Japan Shipbuilding Industry Foundation.

Many elementary schools are devising their own standards for grading their pupils. In one school that we visited, a committee of teachers had devised a scale for grades and had written a "standard evaluation report" that described the levels of achievement required in order to receive each grade.

The junior high school curriculum appears in table 2. In addition to the inclusion of required academic and nonacademic subjects, approximately 10 percent of the hours in school are allocated to elective courses. Junior high schools are under pressure to cover the content of the academic curriculum in order to prepare their students for the high school entrance examination. Accomplishing this goal has become more difficult with the recent elimination of half-day classes 2 Saturdays each month. Because the curriculum was based on a 5.5 day school week, the loss of these 2 half-days of instruction places an added burden on the teachers. The plan to completely eliminate Saturday classes within the next few years is likely to make it necessary for *Monbusho* to make accommodations in the curriculum.

Table 2—Number of school periods per year in Japanese junior high schools

	Grade		
Subjects	7	8	9
Japanese language	175	140	140
Social studies	140	140	70–105
Mathematics	105	140	140
Science	105	105	105–140
Music	70	70	35
Fine Arts	70	70	35
Health and physical education	105	105	105–140
Industrial arts or homemaking	70	70	70–105
Moral education	35	35	35
Special activities	35-70	35	35
Elective subjects	105–140	105–210	140–280
Total Minimum Required	1,050	1,050	1,050

NOTES: Each period is 50 minutes in length. Ranges for the number of class periods for some subjects indicates variation of offerings at schools.
SOURCE: Adapted from Jichi Sogo Center. (1991). *Education system in Japan.* Tokyo: Japan Shipbuilding Industry Foundation.

Although attendance at high school is not compulsory, *Monbusho* also has developed guidelines describing the required subjects during each year of high school (see table 3). The decision about the type of high school to attend—academic or vocational—is delayed in Japan until the 10th grade, when four out of five students choose academic high schools. Entrance into academic high schools is more competitive, and in general, the levels of ability, interest in academic work, and likelihood of attending some form of higher education are greater among students in these schools than among those electing to attend vocational high schools. Although vocational high schools offer vocational as well as academic courses, the curriculum is subject to *Monbusho's* curricular guidelines.

Table 3—Subjects required of all Japanese high school students

Subjects	Required Number of Credits
Japanese language	4
Geography and history	2 or 4
Civic Education	4
Mathematics	4
Science	4–8
Health	2
Physical education	9
Arts	3 or 4
Homemaking	4

SOURCE: Adapted from Jichi Sogo Center. (1991). *Education system in Japan.* Tokyo: Japan Shipbuilding Industry Foundation.

The amount of material that is required by *Monbusho's* guidelines forces high school teachers to move through lessons quickly. Because the college entrance examinations are constructed on the assumption that it is appropriate to cover any topic included in the high school curriculum, omitting material can be costly to students taking the examination. In our interviews, students and teachers generally described the pace of the mathematics curriculum in academic high schools as being very rapid, and many students reported that they struggle to keep up with their lessons. Teachers said that the science curriculum also was demanding, especially in view of the reduced number of hours available each month for classes.

In addition to the separation of Japanese high school students into academic and vocational tracks, a further separation occurs in academic high schools, where students must choose between an emphasis on humanities or science. The level of instruction differs between these two tracks. Humanities students enroll in a series of mathematics courses where the presentation of information is slower, the textbooks are less demanding, and the hours devoted to mathematics are fewer (for example, two versus seven each week in 12th grade) than in the mathematics courses taken by students in the science track. Nevertheless, even humanities students (as well as students in vocational high schools) with whom we spoke reported studying calculus.

Most of the teachers we interviewed reported that their goal of instruction is exposure, rather than mastery. Although most high school students are exposed to calculus, for example, teachers said they did not expect all their students to understand calculus.

Germany. Curriculum guidelines developed within each state provide a uniform basis for instruction. The level of detail described by the guidelines varies somewhat among the states, but most include the content, learning objectives, and instructional periods required of each type of school.

During elementary school, the greatest number of instructional periods (five instructional hours a week each) is spent on German language studies and mathematics. Instruction in the combined subjects of science and social studies occupies 4 hours a week. These 3 major subjects therefore make up approximately half of the 27 instructional hours taught by elementary school teachers. The remaining 13 hours are devoted to instruction in handwriting, music, physical education, arts and crafts, bicycle safety, and first aid.

Each state also specifies curriculum guidelines for the major subjects in the lower secondary schools. These guidelines include suggestions for adapting the level of difficulty and types of presentation to students in the different types of school. Each guideline covers tasks and goals, pedagogical considerations, tips for developing lesson plans, content requirements for each subject, and the number of periods each subject must be taught at each grade level (see table 4).

Table 4—Example from one German state: Periods of math instruction per week in various tracks at the three school types

Grade	*Gymnasium*		*Realschule*		*Hauptschule*
	Math/ Science Track	Language Track	Math/ Science Track	Business Track	(All tracks the same)
5	4	4	5	5	5
6	4	4	5	5	5
7	4	4	4	4	5
8	4	4	4	3	5
9	4	3	5	3	5
10	4	3	5	3	
11	5	3			

NOTE: Each instructional period is approximately 50 minutes in length.
SOURCE: Bavarian State Ministry of Education, Cultural Affairs, Science, and the Arts [BSME]. 1993. *Education in Bavaria: A survey.* Munich: Verlag u. Druckerei G.J. Manz AG.

Teachers with whom we spoke indicated that the manner in which the state's guidelines are put into practice differs from school to school within a state, for teachers are permitted to revise and supplement the content of the curriculum depending upon the social, economic, and cultural backgrounds of each school's students. Thus, lesson plans are based on the official guidelines, but it is up to individual teachers and their colleagues to decide how to apportion the time spent on each topic.

The *Gymnasium* is typically divided into lower (grades 5 to 10) and upper (grades 11 to 12 or 13) levels. In addition, a *Gymnasium* often specializes in certain subject areas and students can choose among those that offer one or more different tracks. For example, curricular specializations in the lower tracks may include an emphasis on classical languages, mathematics and science, modern languages, or the arts. Regardless of the specialization chosen, there is compulsory instruction in German, two foreign languages, history, geography, mathematics, science, art and music, physical education, and civics.

Courses are taught at basic and advanced levels in the upper level of the *Gymnasium* throughout Germany (Conference of Ministers of Education 1989). Courses at the advanced level treat the material in a more comprehensive manner and are notably more difficult than courses at the basic level. Four compulsory areas of study are defined:

Area I. Languages, literature, and the arts,
Area II. Social sciences,
Area III. Mathematics, science, and technology, and
Area IV. Physical education.

Religion is designated as a "compulsory" area, but its presence in the curriculum is left to the discretion of the individual states.

During grades 12 and 13, students are required as a minimum to take a total of 22 periods per week each semester in Areas I and III, 16 weekly periods in Area II, and 8 in Area IV. Students entering 12th grade must also choose two advanced courses, one of which must be either mathematics or a science. A 1987 reform also required all students to be continuously enrolled in at least two (three in Rheinland-Pfalz and Saarland) of the following subjects: German, foreign language, and mathematics (Conference of Ministers of Education 1989). At least two semesters of history or another social science with a historical focus are required, and if German is taken as the primary advanced course, one of the four *Abitur* examination subjects must be mathematics or a foreign language.

United States. Some states and some school districts require that the schools follow the curriculum guidelines that have been developed by administrative bodies at these levels. In the cases where schools retain local autonomy over curricular decisions, the schools may choose either to adopt or ignore state or district guidelines. This choice is influenced by many factors, including the school's history of academic achievement, its financial resources, and community standards. In our interviews, for example, principals and teachers at schools that scored above the mean on state assessment tests said that the state curriculum guidelines were not relevant to curriculum development in their school because the state guidelines defined minimum standards rather than serving as a challenging goal. On the other hand, principals at schools where students were consistently performing below the mean on the state assessment tests regarded the guidelines as a goal they were striving to meet.

Regardless of the source of the curriculum guidelines, most elementary school students in the United States receive instruction in four core areas: language arts (spelling, writing, reading), mathematics, social studies, and science. The remainder of the day is spent in non-core courses, including art, music, drama, dance, and physical education. State guidelines often provide recommendations for school districts on the number of minutes of instruction that should be provided to students in each subject. Table 5 illustrates the time allotments recommended by the state guidelines of one midwestern state.

Table 5—Example of one state's recommended hours of instruction time each week for subjects at the third grade in the United States

Subject	Hours
Mathematics	5.4
Science	2.9
Language Arts	14.2
Social Studies	2.9
Other *	3.5

NOTE: *Other includes physical education, art, music, computers, etc.
SOURCE: Unpublished principal interviews, Third International Mathematics and Science Study, Case Study Project, 1994-95.

Although the core areas continue to receive the most attention during middle school and junior high school, the content of the courses diverges, especially in areas such as mathematics and science. (For simplicity, we will refer to both types of school as junior high schools.) Of the junior high schools we visited, most offered at least two levels of mathematics. Some offered more than one level of science and language arts; others offered three or more levels. Further differentiation of courses occurs at the high school level. Most of the high schools we visited offered courses at a minimum of three levels of difficulty in mathematics, science, and language arts, typically ranging, in the case of mathematics, from general mathematics to honors or advanced placement courses. This degree of differentiation occurs in the all-purpose high schools in the United States because of the need to accommodate differences in the students' abilities, interests, motivation, and knowledge. Such a high degree of differentiation of courses within a single school is unnecessary in the already highly differentiated high schools of Japan and Germany.

Implementing the Curriculum

Creating consensus on guidelines is a first, important step taken in both Germany and Japan for establishing education standards. A second step is to create mechanisms by which these guidelines can be implemented. This is accomplished in diverse ways. Responsibility is assumed by the national government in Japan and by the state governments in Germany. In the United States, it is accomplished by several different agencies.

Japan. One of the most direct means of implementing the curriculum is through controlling the content of textbooks. As was indicated earlier, *Monbusho* reviews all commercially produced textbooks in terms of their adherence to the curriculum guidelines and quality of presentation, and must approve the books before they can be used. Teacher committees at the school are then responsible for selecting textbooks from those approved by *Monbusho.* Although textbooks from several companies are approved for each subject in elementary and junior high schools, all are at the same level of difficulty. This is not the case for high school courses, where *Monbusho* approves textbooks at three levels, ranging from easy to difficult.

Supplementary practice booklets for students, along with the textbooks, are used to illustrate the content of the day's lesson. According to our observations, however, the most frequently used materials were neither textbooks nor practice booklets, but worksheets designed by the teachers.

Teachers we interviewed stated that the implementation of the curriculum is also facilitated through the use of teachers' guides and instructional plans, both of which provide step-by-step examples of ways the lessons can be taught. The guides are published to accompany the textbooks, but the instructional plans are usually obtained from demonstrations that Japanese teachers hold for their colleagues modeling new ways to present a particular lesson. Our interviews and observations also indicated that in addition to attending these demonstrations, teachers participate in department meetings where they share with each other their ideas and concerns about instruction.

Germany. Teachers and administrators whom we interviewed said that textbooks in Germany must conform to the state's guidelines and must be approved by a state committee before they can be adopted by the state's schools. Elementary school teachers indicated that they often form grade-level committees to select the textbooks. Their decisions are especially important because all children are expected to receive the same basic education through the fourth grade. In order to allow students to work at their own pace, teachers said they occasionally used supplementary materials such as photocopied practice sheets.

Textbooks typically establish the content and organization of courses, but if a German teacher decides that the textbooks are too difficult or otherwise unsatisfactory, the textbooks are used only for reference and the teachers develop their own course material. In fact, *Gymnasium* teachers reported that textbooks in mathematics and science were used mainly for reference and review, rather than as an integral part of their courses.

United States. Textbooks in the United States are published for the national market (Venezky 1992). Because there are no national guidelines, publishers have had a wide degree of latitude to develop and market books that they believe will have the greatest sales. However, teachers with whom we talked noted that some state departments of education have begun to evaluate the degree to which the content of the textbooks matches the state's curriculum guidelines, and to recommend that school districts use those books approved by the state. We found that even when the state did not make textbook recommendations, the textbooks selected by schools were often ones that incorporated topics covered in state assessment tests. According to the teachers we interviewed, schools often formed committees of teachers according to grade-level or department to select textbooks.

Adding further to the diversity in the use of textbooks is the high degree of independence granted to U.S. teachers. Their autonomy was evident in the fact that some teachers we met had developed courses on their own, despite the fact that a textbook had been authorized for use in the schools.

Evaluating Achievement

A common procedure for establishing standards for students' performance is through quizzes, examinations, and homework assignments. These methods for evaluating the degree to which the content of the curricula has been acquired differed greatly among the countries in their use and frequency.

Japan. Japanese teachers with whom we talked reported that in contrast to the small tests given every 4 to 6 weeks in elementary school classes, Japanese junior high and high school students take two major examinations each semester. These examinations, usually given at the middle and end of the semester, are similar in form and content to the entrance examinations students take to enter high school and college. Generally, teachers reported using short in-class tests sparingly and placed their emphasis on the periodic examinations.

Some of the elementary schools we visited in Japan explicitly forbid the assigning of homework. Teachers noted however, that this does not mean that students are not expected to study. Rather than have the students complete homework assignments, teachers said that they expected students to review the content of the past day's lesson and prepare for the next day's lesson.

Germany. The number and length of examinations that can be given at each grade in German schools are defined by the state ministry. For example, elementary school teachers in one state said that they are not permitted to give written examinations in the first grade; in second grade it is not permissible to give more than four tests in German and four in mathematics (each no more than 15 minutes long). By third and fourth grades, six tests up to 30 minutes in length in each of these subjects are permitted.

Teachers also reported that depending on the state's guidelines, *Hauptschule* and *Realschule* students take between four and six examinations each year, as well as brief quizzes and oral examinations in mathematics, German, and English. In other subjects, two examinations are permitted. According to the teachers, *Realschule* and *Gymnasium* students are assigned homework every night, primarily to enable the teacher to evaluate how well the students understand the lessons.

United States. We found from our interviews that U.S. teachers at all grade levels have considerable discretion over both the frequency and content of the tests given in class, although some states provide guidelines or regulations regarding the number of class hours which may be used for testing. Among the elementary schools and junior high schools we visited, tests and quizzes are given every 2 or 3 weeks, or at the end of every unit covered in the textbook. Among mathematics teachers, however, quizzes are often given on a weekly basis to assure the teacher that the students are up-to-date in their understanding of the content of the course. The frequency of tests declines markedly during high school, and social science subjects, in particular, may consist of only a midterm and a final examination.

In our discussion with teachers, many indicated that rather than relying solely on traditional testing methods designed to evaluate students' levels of achievement, many school districts were beginning to include performance-based assessments that complement or replace traditional testing methods. These assessments require students to demonstrate what they know by responding to problems they have not previously seen and by applying skills and information they are expected to have acquired in class. Included in the performance-based assessments are portfolios of student work, exhibitions, science experiments, interviews, homework assignments and performances.

Differences Among Schools

Discussions of education standards must deal with the question of how the same standards can be applied to all schools within a region when the backgrounds of the students and quality of the teaching staff and the academic facilities differ. This matter is less likely to be an issue in Japan than in Germany and the United States.

Japan. Japanese educators and parents acknowledged to us that there were differences in students' achievement between elementary schools in poor and affluent areas, but they considered these to be minor differences. No parents, for example, suggested that they would ever decide where to live primarily because of the quality of the elementary school in the neighborhood.

This was not the case with parents of junior high school students. Many indicated that they were aware of an unofficial ranking of junior high schools in the area, and one principal told us that in his experience parents often did consider the reputation of the junior high school in selecting a residence. In some Japanese schools, nearly all of the students aspired to enter a highly ranked high school and eventually attend college. At other junior high schools, teachers reported that they had trouble keeping students motivated and interested in school. The guidance rooms at these schools were filled with pamphlets describing and advertising vocational high schools and career-training centers.

Japanese high schools exist within a socially derived hierarchical structure in which the reputation of a high school is defined by the number of graduates accepted by universities and the prestige of the universities to which they are admitted. The entrance test for high schools, therefore, acts as a tracking mechanism, separating students of different academic ability into different schools. While all academic high schools follow the same curriculum, teachers told us that the rigor and depth with which the curriculum is covered are adjusted to match the academic abilities of the school's students.

Vocational high schools offer an alternate form of schooling. On the basis of our interviews and observations, it was clear that within the vocational high school, the various vocational tracks offer curricula that require different levels of academic ability. Vocational teachers pointed out that although graduates of vocational high schools have an advantage in terms of employability, they are at a disadvantage in taking college entrance examinations, which cover only academic subjects. They also noted that the restricted opportunities for attending college contributes to a current lack of popularity of vocational high schools among Japanese students.

Germany. Parents and teachers agreed that the role of elementary school is to provide a good foundation in education and social skills for all children. Most of them also felt that this goal was less likely to be attained in some neighborhood schools than in others, especially those with high enrollments of foreign children.

While parents and teachers recognize that there is some variation in the standards of high schools among different neighborhoods, they see more similarities than differences among individual *Hauptschulen* and individual *Realschulen*. *Gymnasien*, while more variable in standards, are nevertheless clearly perceived as having the highest standards. The most frequently mentioned basis for the greater variability of the *Gymnasien* was the disparity in standards among the various states.

United States. In our interviews with parents and teachers, two factors were most often mentioned as having a major influence on the standards adopted by a school and on students' levels of achievement in the United States. They are: the level of funding available for education in different school districts and the level of involvement and support provided by the parents. The fact that schools within a district share the same tax base and receive their funding from local tax revenues means that schools within the same school district generally have comparable budgets. But dependence on local tax revenues also means that budgets vary greatly among school districts. Those where families have high incomes and high property values are able to spend more money on teachers' salaries, physical facilities, and instructional resources than those in poorer districts.

In addition to the variation among schools resulting from differences in funding, many teachers and administrators in economically depressed neighborhoods spoke of the strong impact differences in students' daily environments have on the ability of students to learn. A principal at one of these schools had this to say:

> All I can say is that it is easy to teach kids who are well-prepared, who have the parents helping them, who have the advantages of the average middle-class child. It's hard to teach kids who don't have advantages, who can't go home and say 'help me.'

Typically, students who begin school in disadvantaged school environments remain in disadvantaged environments at each successive level of schooling. Teachers and principals said that students who followed this path frequently entered junior and senior high school with much lower levels of knowledge and academic skills than students attending schools in more prosperous areas. Teachers at one high school enrolling predominantly low-achieving students explained that because of this, standards of any kind were barely relevant. Rather than debating the merits of national standards, teachers and administrators in these schools were more concerned with finding ways to attract students' interest and to enable students to meet the minimal standards of the state.

Parents in these schools had a different view from those held by the teachers and administrators. Although they recognized the discrepancy between what students were capable of doing and the state's guidelines for what they should be doing, they did not dismiss the relevance of guidelines. In our discussions with them, these parents were generally supportive of national standards. In fact, some of the most active advocates of the standards published by the National Council of Teachers of Mathematics were parents of students in the lowest achieving elementary school that we visited.

Parents of students in middle-class schools also expressed their support for the equalizing effect of national standards. A parent from one of the middle-class schools spoke of the difficulties unequal standards created for students who move to a new school in the middle of the year and find themselves either ahead of or behind their classmates.

Standards in the Classroom

Ultimately, the application of education standards occurs in classrooms. It is easier to apply standards to students' performance when there is grouping of students within a classroom according to their level of ability than when the grouping occurs between schools. All countries that promote universal education at the elementary level face this problem. The application of common standards also becomes a problem in countries such as the United States, where grouping by ability is practiced in some classes of the all-purpose junior high and high schools.

Japan. According to the teachers, students in many high schools are assigned to different classes on the basis of ability and future plans, but they are not further divided into groups within the classroom. Nearly all of the educators with whom we spoke about ability differences among students said that they believe that grouping by ability within classrooms is discriminatory and may hurt students emotionally. Teachers also indicated that when students are found to have trouble in keeping up with their classmates, they often spend time with the students outside of class or provide remedial homework assignments during the summer or winter vacations. Alternatively, the students may choose to attend remedial *juku* (private after-school classes) that provide review and practice related to the content of the government-approved textbooks used in the students' school.

Germany. German schools, like Japanese schools, do not group students by level of ability within classes. Teachers explained that they believe it is the school's responsibility to foster each student's full potential, and that it is the teachers' responsibility to bring the weaker students along and to help them keep up while fostering learning for all students. In contrast to Japan, where it is extremely rare to require a student to repeat a grade, German teachers can make this recommendation if they believe the situation would only worsen if the student were promoted.

The value of small group interactions is acknowledged by German elementary school teachers, who reported to us that they used small groups and peer tutoring as integral parts of classroom instruction. Teachers also said that the importance of the group in classroom instruction is also acknowledged in the practice of having students and their teacher remain together from first through fourth grade of elementary school. It is also a common practice in Japanese schools to keep the teacher and students together for more than a single year. In both countries the argument presented to us for this practice is that it enables teachers to know their students very well and to be able to provide appropriate types of assistance before any problems become magnified.

In our interviews, teachers in secondary schools also said they saw it as their responsibility to intervene when students were having academic difficulties. *Hauptschule* teachers made themselves available after class and frequently organized group work and peer tutoring as means of avoiding or reducing academic problems among the students. *Realschule* teachers said they expected their students to be more motivated than *Hauptschule* students and to take the initiative in learning and studying. Nevertheless, they encouraged peer tutoring by having students work on their in-class exercises in pairs or in small groups. Our classroom observations revealed that these approaches to instruction were not commonly used in *Gymnasium.* The teachers we interviewed said they thought it was acceptable for students to study together after school and ask each other for help if necessary, but they did not propose that it was their duty to recognize students who were having academic difficulties. In their view, academic problems usually arise from lack of study rather than lack of aptitude, and students who are unwilling to work hard should go to an easier school form.

United States. In contrast to both Germany and Japan, no effort is usually made in U.S. schools to keep a class composed of students and teacher together for more than a year. Students are usually assigned to a new classroom and a new teacher when they move to the next grade. As a result, teachers are faced each year with the need to provide some means of socialization within the classroom as well as to teach the students the subject matter. A commonly used means of accomplishing these two goals is through the formation of cooperative learning groups. Teachers explained that they believe such groups facilitate interactions among students and provide an opportunity for peer tutoring during classroom time. One junior high teacher explained her support for cooperative learning groups:

> I really believe in the hands-on approach. I believe that all students do not arrive with the same level of readiness. That is why I think group learning is really good for them. Peer coaching goes on within a group. And students, if you make them comfortable with a new group, they will help each other out.

According to the teachers, another common response, especially in elementary schools, was to form subgroups of students who were taken out of the regular classroom to receive accelerated or remedial instruction in basic subjects. Most of the teachers we talked with reported using such a strategy. For example, during mathematics lessons, students who were unable to keep up with the regular lesson or those for whom the regular lesson was too easy frequently went to a different teacher to receive instruction that was more appropriate for their level of ability. One middle school teacher described how she tried to make herself available for students who were having difficulty:

> The way I deal with it is that the kids who are doing poorly come in for extra help or sign up for the math assistance class. And for those who do well, you give them problems before class or after class to make them think. Within the class, I know that there are kids who are bored silly and those that are drowning. And I encourage kids to ask questions. I also encourage kids to express their solutions. Some kids may do it differently and be four steps ahead of everyone else. I would have him explain it to everyone. Then I would ask another kid to give his solution. Then I would tell the solution that would always work. That way the kids learn something.

The practices and policies in grading and evaluation varied widely. At one school we visited, the local school board and principal adopted a policy of leniency in grading and evaluation. The consequences of this policy were evident in observations of an eighth-grade mathematics class for advanced students. The teacher told the class:

> I am happy to report that 17 out of 25 students are running an A plus average. Good job! I think more of you can get A pluses.

Students received such remarkable grades because the teacher allowed them to take the examinations with open books, to refer to their notes, and to resubmit assignments until they answered everything correctly and received the top score.

U.S. schools also organized tutoring programs for students needing additional assistance. According to the teachers, at many schools students who need help in academic subjects can receive help either from teachers or fellow students who excel in these subjects. However, the teachers also indicated these efforts are not always successful and that students are sometimes promoted to the next grade with serious deficiencies in their knowledge. The principal of one vocational high school told us that a large percentage of the students at his school read at the elementary school level when they entered the ninth grade.

Entrance Examinations

One of the most direct means of assuring that academic standards are upheld is through examinations administered at the completion of junior high school and/or high school. These examinations play an important role in the lives of students in all three countries, for the score they receive has a strong influence on the likelihood students will be admitted to a school or college of their choice. Tables 6 and 7 list the entrance and exit examinations, as well the typical in-class examinations required of secondary students in academic and vocational tracks in the three countries.

Table 6—Examinations required of academic track high school students

Japan	Germany	United States
• Entrance exam is required for academic high schools. • The entrance exam covers 5 academic subjects: Japanese, mathematics, social studies, science and English. All exam questions are based on the *Monbusho* curriculum.	• Students entering the *Gymnasium* in the 11th grade must either have a letter of recommendation from their *Realschule* teachers or take an entrance exam.	• No entrance exam required for public schools.
• Midterm and final curriculum based exams are given each semester during the 10th and 11th grade, and the first semester of the 12th grade.	• Exams are based on state-mandated curriculum guidelines. • From the 5th thru 10th grade: 2 to 4 in-class exams are given per semester in the primary subjects of English, German, and math; usually one per semester in secondary subjects. • Students in grades 11–13 take written and oral in-class tests in subjects selected from three fields: languages, literature, fine arts; mathematics and science; and social sciences. • Oral exams play a larger role in grade 13.	• Exams vary by instructor and school policy. Most teachers give a midterm and final exam each semester in academic subjects. • Results of standardized achievement exams (and other considerations) may be used to place students in courses of appropriate level. • A standardized state or national achievement test is generally given in grades 10 and/or 11.
• No exit exam is required. All college aspirants take the Center Examination and exams from individual colleges during the 12th grade. The Center examination is based on the *Monbusho* curriculum.	• The *Abitur* examination is required of all *Gymnasium* students during their final year (grade 13 in most states), and is pre-requisite for university entrance.	• Some states require minimum competency exit exams. College-bound students must take entrance exams for application to 4-year colleges and universities.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–95.

Table 7—Examinations required of vocational track students

Japan	Germany	U.S.
• Entrance exam is required for vocational high schools. • Exam covers five academic subjects: Japanese, mathematics, social studies, science, and English. All exam questions are based on the *Monbusho* curriculum.	• A school leaving certificate from a *Hauptschule* or *Realschule* is required for entrance to most vocational schools, including vocational *Gymnasium.* • The completion level (9th or 10th grade) of the school leaving exam and a student's grades determine eligibility for specific courses of study.	• No entrance exam required for public schools.
• In-class midterm and final exams are given each semester.	• In-class midterm and final exams are given each semester in full-time vocational programs. • By law, at least one intermediate exam is required during the course of training to determine the trainee's level of proficiency.	• In-class exams for vocational classes vary by school policy or teacher preference. • A standardized state or national achievement test of academic subjects is generally given in grades 10 and/or 11.
• Students are strongly encouraged to take certification exams in vocational fields to increase their employability.	• Students must take and pass an examination (involving a practical demonstration of skills, an oral presentation and a written portion) at the end of their program in order to qualify for work in their chosen occupational field.	• No exit examinations are required, unless the state requires a minimum competency exam. • Certification exams not required.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–95.

Japan. In order to advance to high school, graduates of junior high schools must take a standard high school examination that covers the five core subjects in the *Monbusho* curriculum: Japanese, mathematics, social studies, science, and English. According to the teachers with whom we spoke, each test is 40 minutes long and all are weighted equally to produce a total score. This score, along with the student's junior high school grades, is used to determine the student's eligibility for the high school the student wishes to enter.

High school students wishing to attend a college or university are required to take the Center Examination, an examination similar in format to the high school entrance examination and the entrance examination for the university they want to attend. In the past, Japanese universities admitted students solely on the basis of the scores they received on the Center Examination. However, teachers indicated in our conversations with them that recently it has been possible for students to be accepted by universities on the basis of recommendations by their schools because of outstanding merit or extraordinary skills.

Germany. Nearly all *Gymnasium* students take the *Abitur* examination. This examination is the gateway to university studies, as well as to other training and education programs. The Conference of Ministers (KMK) has established uniform national standards for 33 subjects which cover the academic knowledge that *Abitur* examinations are expected to test (KMK 1987). The candidate's knowledge is assessed in one oral and three written examinations covering four subjects, including two designated as advanced subjects.

The *Abitur* diploma lists all grades from all courses a student took in the upper level of *Gymnasium*, the grades received in the 22 basic courses, 6 advanced courses, and 4 *Abitur* examinations. *Gymnasium* students are acutely aware of the criteria for university admission, especially for admission to subjects that are highly restricted because of their great popularity.

Although *Realschule* students may transfer to a *Gymnasium* and ultimately take the *Abitur*, a relatively small percentage of *Realschule* students do so. Instead, many pursue further education through practical training programs after completing their secondary education at the *Realschule*. In Bavaria for example, only 1.7 percent of Realschule certificate holders transfer to a Gymnasuim, while 69 percent continue their education in a vocational training program (Bavarian State Ministry of Education, Cultural Affairs, Science, and the Arts 1993). According to the teachers we interviewed, in order to qualify for practical training experiences, both *Realschule* and *Hauptschule* students must receive their *Realschule* or *Hauptschule* certificate. Teachers also indicated that although *Hauptschule* students do not take completion examinations in most German states, reliance is placed on their high school grades in decisions about future training and education opportunities. This was also said to be true for students who successfully complete *Realschule* except in states with centralized examination systems. Students in these states must take a centrally developed completion examination after the 10th grade (Bavarian State Ministry of Education, Cultural Affairs, Science, and the Arts 1993). The results of the examination plays an important role in the students' qualification for various vocational training programs.

United States. Minimum competency tests administered at the completion of high school have become increasingly popular in the United States during the past decade. These tests operate as standards students must meet before they receive their high school diploma. The students for whom the score on these tests is most meaningful are those who seek employment immediately after graduation or who choose to attend a vocational training program.

Students who plan to seek admission to a four-year college or university must usually take one of two college entrance examinations: the American College Test (ACT) or the Scholastic Aptitude Test (SAT). Both are commercially prepared examinations and are administered nationally. The ACT is designed to measure progress in areas of English, mathematics, social studies, and natural sciences, and thus has a format similar to that of the Japanese and German tests. The SAT, on the other hand, requires students to answer questions covering a range of verbal and mathematical skills.

Nearly all universities in the United States publish minimum scores that are required on entrance examinations to qualify for admission. Thus, scores on these examinations play an especially strong role in determining students' chances for admission to the country's top public and private colleges and universities. Two-year community and junior colleges rarely require minimum scores for admission.

Equity of Education

The question always arises whether standards in education result in a fair education system. Differences in opportunity to learn exist to some degree in all countries, thus standards that are hard to meet in one location may be easily attained in another. We asked the participants themselves to tell us their views about this question.

Japan. Three male students at one of the Japanese vocational schools were interviewed as a group. They had no hesitation in expressing their opinions. The first student said it was fair to establish such standards and explained why:

> Those who are smart and those who are not smart study together in one class. No matter how smart or not, you can receive the same education, and this is true at any level of Japanese education—elementary, junior high, and high school. The education at this school is fair in the same way, and I think it's good.

The second student agreed, "I also think it's fair because teachers address their lectures to the whole class. I do feel kind of bad for the students who do poorly, so I cannot really say if it's good or bad." The third student explained, "I think it's fair for the same reason. Dividing students is like attaching labels. Students who are not smart will think of themselves as dumb students, and once they believe they are not smart, their academic performance will become worse and worse."

Although national standards in Japan help ensure that during the years of compulsory education all students have similar opportunities to learn, they cannot guarantee similar outcomes. According to many parents and teachers we interviewed, a primary cause of students' failure to do well in school is the influence of social class on academic achievement. Many parents and teachers also said they believed socioeconomic differences have been getting wider since the 1980s and that highly educated parents were able to provide their children with opportunities for higher education that poorer families could not. This point was emphasized by a working class mother of a high school student:

> The way it looks now, it is impossible to keep up by just going to school. One needs to go to *juku* nowadays. That is all right for students from families with money, but if you don't have money, unless you exert an enormous amount of effort, it is very difficult. I wonder if the system has to be such that it is sustained by a family's economic power, or could there be something different.

Germany. Elementary education in Germany is molded by an egalitarian philosophy of education and is organized to provide equal access to the prescribed subject material. At least, according to teachers and parents with whom we interacted, this is perceived to be the situation for children who enter elementary school ready to learn. Teachers also said that in order to increase the possibilities for other children, such as those of foreign workers or those lacking social skills, supplemental remedial instruction and experiences are provided.

After the elementary school years the German school system is somewhat flexible, but teachers with whom we spoke noted that upward mobility at the secondary level is less likely than lateral or downward mobility. Despite this, individuals we spoke with saw the separation of students into differentiated forms of schooling to be a way of providing an education that was appropriate for the students' capabilities and necessary for giving them the kinds of skills required to become productive members of society.

Most of our respondents said they thought the system works well for a majority of the students and is fair because of the multiple paths that exist to the *Abitur* and to advanced professional training. At the same time, they acknowledged the influence of various cultural and environmental factors on the academic achievement of children, including lack of family support, poor home environment, and difficulties with the German language. For the most part, however, these factors were seen as being beyond the control of the school system.

Parents also told us that they believed those parents who had attended *Realschule* or *Gymnasium* themselves were in a much better position to advise and assist their children than were those with less education. Further differentiating these families from those whose children were in *Hauptschule* were the higher aspirations they had for their children and the family's awareness of the opportunities that a higher degree could provide.

United States. Because state and local governments contribute about 92 percent of the funding for schools (USDE 1993a), it is inevitable that there would be great variability in the opportunities for education. The federal government has attempted to equalize opportunities through federal assistance grants for schools enrolling students who need special forms of education, whose native language is not English, and whose families have low incomes. These funds help to support programs for these children, but most parents and teachers we spoke to recognized that although children have access to free public education in the United States, some schools have more resources, better facilities, and better trained teachers.

In general, the U.S. education system supports the practice of tracking students by ability, and most parents with whom we spoke approved of the provision of instruction that parallels the students' levels of ability. Reservations were expressed about this practice, however, by parents who pointed out that narrow measures of ability, such as test scores, resulted in the overrepresentation of certain ethnic and racial minorities in the lower tracks.

Summary

A commonly held perception of education standards is that they provide precisely defined curricula for a nation's schools. This perception is inappropriate in the three countries we studied. Rather, education standards are defined by guidelines that describe, in general terms, the accomplishments expected at each grade level.

The relationship between establishing and enforcing national guidelines varies greatly. National guidelines may attain legal status themselves, as is the case in Japan, or they may function as suggestions that must then be enacted into law by state governments, as in Germany. Preliminary steps have been taken in the United States toward defining voluntary national standards. These standards are derived primarily from the Goals 2000 activities and from favorable responses to standards proposed by nongovernmental bodies, such as professional organizations.

What ought to be included in national standards in each of the three nations remains unclear. Some educators propose that the standards should deal with outcomes in terms of students' achievement as well as with the content of the curriculum. Others include a consideration of the opportunities provided by local, regional, and national government agencies for students to learn. What is included in the three countries studied is not consistent.

Even when the content of the curriculum is described in education standards, strict adherence to the curriculum may not be demanded of all schools and all teachers. This occurs in Japan, for example, where it is possible within a nationally-controlled education system for teachers to deviate from the curriculum when it does not seem to be meeting the needs of the students. In fact, based on our interviews and observations, teachers in all three countries appear to be granted more autonomy than might be expected in such matters as their reliance on textbooks and their day-to-day organization of the lessons. Rather than playing a central role in defining the curricula, textbooks are sometimes supplemented or even supplanted by the material contained in teachers' guides and instructional plans, teaching demonstrations, and teachers' discussions.

The general perception among parents we interviewed in all three countries was that curricular guidelines are not unfair and that there is a need to ensure that students from different schools or students moving from one school to another have equal opportunities to cover the same material. In responding to this objective, the question is raised how the same standards, whether in the choice of textbooks or in evaluations of student achievement, can be applied universally.

Differences exist to varying degrees within the three countries in achievement, not only among regions of the country, but also among school districts, schools, classrooms, and among the students themselves. As a result of this high degree of diversity it is difficult to accomplish the objective of meeting common standards for all students.

A wide range of practices has been instituted in attempts to apply standards, including retaining students at the same grade level, having the teachers or peers provide extra help to students encountering academic difficulties, sending students to after-school classes, dividing students within a classroom into groups, and separating students into different curricula. Defining standards and finding ways of implementing them has proven to be one of the most vexing problems in public education.

Chapter 3

Dealing with Differences in Academic Ability

"I think there is a high correlation between impressive academic achievement and parental involvement. Where parents are involved, kids are performing better."

(Teacher in the U.S.)

"If the child is not suited to the *Gymnasium*, if he cannot learn foreign languages and is not good at abstract thought, then this child will continually fail, and will continually experience frustration, and such children are deformed in the development of their personality. They have continual experiences of failure and no successful experience... as a result, we say, do not send children to the *Gymnasium* who are not suited for it. Such children belong as soon as possible in the correct educational path."

(Teacher in Germany)

"She no longer holds back now that she is at the *Realschule*. This is her level. She studies, does her homework. It is fun for her. I think it is better for her to have a good *Realschule* degree than a bad *Gymnasium* degree."

(Parent in Germany)

"As far as inborn ability goes, I can't say that it isn't there, but I say that it doesn't matter. Regardless of whether you have ability, if you persevere, you can get a good outcome."

(Teacher in Japan)

"If I use instructional grouping, those who are placed in a slow group would feel very ashamed. When I think of how they feel, dividing them has a more negative than positive effect."

(Teacher in Japan)

Regardless of a society's beliefs about what factors are most relevant to students' academic achievement, such as students' level of effort or ability or teachers' styles of teaching, every teacher must cope with a wide range of knowledge and skill existing among students in every classroom. Similarly, every parent must recognize the fact that all children do not learn with equal ease and effectiveness. The response to these facts in some countries, such as the United States, is to "stream" students into different groups or tracks from the time they enter school. Other countries, such as Japan and Germany, attempt to provide all students in the early elementary school years with the same type of education and to prohibit any separation of students into groups according to ability. In Germany, separation occurs at fifth grade. Not until high school is any effort made in Japan to channel students into different curricula. For example, math and science instruction and assessment in the three countries varies depending on grade level (in all three countries), and school type (in Japan and Germany) (table 8).

Table 8—Instruction of math and science curricula at grades 4, 8, and 12

Grade	Japan	Germany	United States
4	• All students study same curriculum in math and science. • Ability grouping prohibited.	• All students study a comparable curriculum in math and science. • No in-class ability grouping.	• All students study math and science. Content subject to teacher discretion. • Ability grouping begins, including pull-out programs for remedial and gifted students.
8	• All students required to take math and science. • All students study same curriculum. • Ability grouping prohibited.	• All students required to take math and science. • All students study comparable content, but level of difficulty and pace of instruction is determined by school type (e.g., *Hauptschule, Realschule, Gymnasium*).	• All students required to take math and science. • Students study different content, and level of difficulty depends on selection of courses.
12	• All academic and vocational high school students required to take advanced math (e.g., calculus) and science courses. • Level of difficulty and number of hours adjusted for track and school type.	• All *Gymnasium* students required to take math and science courses. • Number of hours required varies according to track within schools (i.e., mathematics-science, modern language, humanities).	• Students not always required to take math and science courses. • Content and level of difficulty differs markedly among elective courses. • Some schools offer advanced placement courses.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–95.

Our discussion of differences in academic ability begins with consideration of the philosophical perspectives of these three nations concerning the basis of individual differences in academic ability. Following this, three main approaches to dealing with differences are considered: tracking of students, remedial programs and programs for gifted students, and teachers' responses to differences in students' abilities, motivation, interests and home backgrounds.

Perception of Differences in Ability

Japan. Primary attention is given in Japan to the influence of effort on all forms of accomplishment. When a student has difficulty in school, Japanese parents and teachers said they viewed the problems as resulting from lack of effort or inadequate family support. Regarding children as diamonds in the rough ready to be polished, various education agents must decide how much they would like to refine and strengthen the potential that is assumed to exist in every child.

Learning to work diligently was considered by both parents and teachers to be an important contributor to the self-development of all individuals. Although individual differences in academic ability were acknowledged, accomplishment was considered to depend primarily upon the effort an individual expends. All children were said to be able to achieve satisfactorily in school if they were willing to study hard. This belief in the efficacy and importance of hard work, along with a centuries-old admiration for learning, has led the Japanese to convey to their children that getting a good education should be the major goal of children and youths. In fact, it was clear from our interviews with parents, that children are told that an active social life, participation in sports, and other factors described as being important to healthy development should not come in the way of getting a good education.

While there is an acknowledgment of differences in ability among individuals, the tendency among Japanese is to disregard consideration of this factor and to emphasize that accomplishment can always be increased through the application of greater effort. This view was expressed clearly by one teacher: "As far as inborn ability goes, I can't say it isn't there, but I say that it doesn't matter. Regardless of whether you have ability, if you persevere, you can get a good outcome." A parent put it even more succinctly: "Motivation. That's all that counts. Unless you are a genius, success depends on how hard you are willing to work."

The motivation to do well is considered to be a virtue in its own right. To encourage students to study hard, both teachers and parents said they often tell children, "If you tried your hardest, it wouldn't matter if you succeeded or not." In the long run, it is explained, success results from cumulative effort.

The Japanese student, regardless of how readily or slowly he or she may learn, absorbs the view that no special natural talent is necessary in order to do well in school. In fact, many teachers and students were quick to redefine individual differences as differences in *gakuryoku* (acquired academic ability). For example, rather than being attributed to innate ability, success in mathematics was perceived by students to be dependent on the slow and steady accumulation of knowledge and skills. Even in high school, after the time students have been separated into different tracks, differences in performance were attributed to students' motivation for academic work, their interests, and their occupational plans, rather than to differences in ability.

Germany. In contrast to the Japanese focus on effort and hard work as paths to success, German respondents said the primary factors contributing to differences in academic ability were natural disposition (often referred to as innate intelligence and talent), the home environment, and parental support.

The attributions offered by teachers about individual differences in academic ability differed only slightly among the different types of school. Teachers at *Hauptschule* and *Realschule*, as well as those in *Grundschule*, cited innate intelligence and family support as the two most important determinants of academic achievement. Teachers in the *Gymnasium* added several more factors. In addition to innate intelligence, which they typically mentioned first, and family support, they added motivation to learn and students' interest in the material being presented. Parents and students also mentioned differences in innate ability as a primary factor contributing to differences in students' academic outcomes. It was normal, they explained, that not everyone could be good in all academic subjects.

United States. Teachers, parents, and students with whom we spoke in the United States readily acknowledged the existence of differences in academic ability among students and often pointed out the magnitude and range of these differences. When asked to explain the basis of these differences, they cited family stability and family support as the major factors. In poor communities, broken families were most frequently blamed for low achievement, while in more affluent areas, family support for schooling was cited as the main factor.

Socioeconomic status also appeared to influence the respondents' beliefs about the role of innate ability. Explanations focusing on innate ability occurred more frequently in affluent communities. Parents and teachers in poor communities seldom mentioned innate differences in intelligence or personality as major contributors to differences in academic ability.

Dealing with Differences in Ability in Japan

Tracking. Japanese educators and policymakers we interviewed firmly opposed the idea of any form of tracking during the elementary and junior high school years. Indeed, they suggested that any effort to separate students into tracks on the basis of ability is unfair. One teacher summed up this view in the following manner:

> If a school separates students according to ability differences, what the school is doing is discriminating among students. This goes against the school's basic goal of having students learn as members of a group.

Elementary school teachers suggested to us that the use of instructional grouping would hurt students emotionally, so much so that they would lose their motivation to study. One teacher described the negative emotional effects of grouping elementary school children in this way:

> Those who would be in the slow group would not do any work because they would be discouraged by the fact that they were placed there. They would feel their teacher gave up on them and also feel that their peers looked down on them. I think it is very unbearable for the students to be labeled like that.

The Japanese egalitarian conception of education is abandoned when students enter high school. Only those receiving high scores on the high school entrance examination and high grades in middle school are permitted to enroll in academic high schools, and the most prestigious high schools require the highest qualifications. Japanese academic high schools, like the *Gymnasium* of Germany, seek to prepare students for admission to university; thus their prestige is based primarily on the students' scores on the college entrance examination and the universities and colleges in which the school's graduates enroll.

Students who receive the lowest test scores and the poorest grades in middle school generally attend vocational schools. This is not always the case, however, for some students who are qualified to enter academic high schools choose, instead, to attend a vocational high school. Regardless of the type of high school in which the student enrolls, acceptance in the highest level schools is characteristically explained as the result of working hard rather than of being "smart." Nevertheless, most of the older Japanese we talked with accepted the tracking system and saw it as being neither good nor bad. By the time a student reaches high school, according to one parent,

> He or she should know what they like and what they want to do in the future. So there is no need for them all to stick together as in elementary school.

There is further tracking of students into a humanities or science track within academic high schools. Coursework, especially in mathematics and science, is not at an equal level of difficulty in the two tracks. Within each track, further stratification may occur. Students who did well in their earlier academic work may be channeled into the more difficult tracks and those who performed less well are placed in less demanding tracks. These separations are introduced with an eye on the college entrance examinations that take place during the senior year of high school. "There are students who need to study math for college entrance exams and those who don't," explained one teacher, "We do such grouping for every major subject, but especially for math and English."

Whole-class instruction. Classroom observations indicated that students in Japan are taught primarily through lessons involving the whole class, a mode of classroom organization and instruction dictated by several considerations. The size of Japanese classes and of Japanese classrooms is one concern. Japanese classrooms at all grade levels contain large numbers of students—at least 35 in each classroom—and the rooms are generally small in size. As a result of these conditions, it is difficult to divide the students into small groups that can work effectively.

A more important justification of whole-class teaching made by many teachers and parents we spoke with was the belief that mixed-ability classrooms provide social as well as pedagogical benefits. It is assumed that through whole-class participation in mixed-ability classrooms, students learn that the world consists of many different kinds of people, and through their daily experiences acquire satisfactory ways of interacting with children and adults who are not like themselves or their family and friends.

Pedagogically, whole-class instruction means that all children receive instruction throughout the whole class period. The level of instruction in the mixed-ability classrooms is aimed at the average student. To help slow learners understand the lesson, the teacher begins with easy material and gradually increases the level of difficulty. Students who learn rapidly are asked the more difficult questions and may be asked to explain their solution to their classmates. A fundamental assumption behind whole-class teaching, which was voiced by the teachers we interviewed, is that students need to hear alternative interpretations and responses to problems and that through skillful guidance from the teacher, they come to differentiate among answers in terms of their efficiency and effectiveness.

Dealing with Differences in Ability in Germany

Tracking. The elementary school teachers with whom we talked described the first four years of schooling as a time when German students are educated in an egalitarian atmosphere which strives to provide all students with the same education and social foundation. In line with this goal, there is no tracking between classes nor grouping within classes during the elementary school years.

Teachers said that they regard it as their duty to try to reduce the differences in ability within each class by making sure the "weak" children are "brought along" with the rest of the class. In doing this, they said they frequently supplement whole-class instruction with mixed ability groups and peer tutoring in order to promote socialization and to facilitate learning.

The situation changes abruptly in Germany at the beginning of the fifth year when the children are assigned to one of the tracks that lead to the various kinds of secondary school. Teachers and parents attributed this change to the belief that students' academic as well as social development can be fostered best in an environment that is most appropriate for them.

In contrast to Japan, where tracking does not begin until after 10 years of schooling, tracking begins in Germany after only 4 years. In both cases, tracking has profound, long-term effects on the student's opportunities for entering a university. Although it is conceivable that a Japanese student in the vocational track could qualify for entrance into a university, it rarely occurs. In fact, based on the data we have collected in both countries about the available pathways to such a goal, it is likely that graduates of *Hauptschule* could enter a German university somewhat more easily than Japanese vocational school graduates could enter a Japanese university. Even so, it is vastly more difficult for the *Hauptschule* graduates to qualify for admission to a German university than it would be if they had attended a *Gymnasium.*

Because of the gravity of the decision about placing the child in one track or another, both teacher and parents participate in the decision about which track the child should follow. The decision is made on the basis of the child's performance during the fourth grade, and both teachers and parents reported to us that in making this decision an effort is made to match the child with the type of secondary school that provides the most appropriate level of education.

Dealing with Differences in Ability in the United States

Pre-kindergarten screening. Attention is paid to individual differences among U.S. children even before they enter school. In fact, prior to entering kindergarten, children in many school districts in the United States are given physical and psychological tests to assess their readiness for school. On the basis of these tests the child's parents and future teacher are sometimes alerted to give special kinds of attention and treatment to the child. This type of pre-kindergarten screening is rare in Japan and Germany, partly because kindergartens are not part of the public school system and partly because of a belief that kindergarten is too early to attempt such screening.

Ability grouping and tracking. Another practice that differentiates U.S. from German and Japanese elementary schools is the introduction of grouping based on level of academic ability. Our classroom observations and interactions with teachers provide the basis for a general description of ability grouping and tracking practices in U.S. schools. During the early years of elementary school, children may be divided into reading and mathematics groups on the basis of their competence in these subjects. Beginning around the fifth or sixth grade, many schools also divide students into general and advanced courses in mathematics and language arts. By the seventh and eighth grades, nearly all students are tracked into different levels of courses in these two subjects, and many are also tracked into different levels of science courses.

Many teachers and parents indicated that the courses into which a student is tracked during these elementary and middle school years have a strong potential influence on subsequent opportunities for enrolling in advanced courses. Teachers and parents said that without the information provided in the earlier courses, it would be very difficult for a student to succeed at the advanced levels, and the effects of early tracking could persist beyond high school. For example, students who study remedial mathematics in high school have fewer opportunities during their university studies to enroll in courses available to students who have already studied calculus or pre-calculus.

Assignment to a particular track during the middle school and junior high school years in the United States, depends on the student's scores on standardized tests, their past academic performance, and parental wishes. Some school administrators indicated that they are responsive primarily to parental wishes; others relied more strongly on test scores and previous grades. However, by the high school years, enrollment or assignment to a particular course was typically determined by the courses taken earlier, past academic grades, and the student's goals for higher education. Counselors in some schools, responding to the student's educational and occupational goals, played a central role in guiding students to make certain selections among the courses.

In the United States, the proportion of students taking advanced level courses varied from school to school among those we visited. When large percentages of students are college-bound, more will enroll in advanced or honors courses. However, school counselors said that admission to a university is not precluded by enrollment in courses at the "general" level. In fact, most high school students elect general courses in mathematics and science. Vocational courses are often selected not only by students who intend to go directly into the workforce, but also by those who plan to enter a university or to obtain further vocational training.

Despite the wide variety of available courses, a current trend in U.S. schools is to attempt to individualize instruction to an even greater degree. This is accomplished in several different ways, including "pull-out" programs, cooperative learning groups, and computer-generated instruction.

U.S. elementary schools use "pull-out" programs to deal with differences in students' levels of ability. In these programs, students are removed from their classroom for an hour or less each day to receive supplemental one-on-one or small-group tutoring in specific subjects.

Some teachers said they also form cooperative learning groups in their classroom to provide opportunities for peer tutoring. The primary purpose of these cooperative learning groups is to place students of differing levels of ability in situations where they can learn from each other.

Many teachers also stated their belief that computer-generated instruction has gained in popularity because it is possible to provide computer programs that are appropriate for the child's level of knowledge. For example, drills in mathematics and science can be provided for students in need of assistance, as well as for students who are capable of handling more difficult materials.

Despite the interest in individualizing instruction, most students in U.S. schools still receive whole-class instruction, where the teacher remains the authority, both in imparting the subject matter and in evaluating the students' responses. This type of whole-class instruction is in strong contrast with the whole-class instruction that occurs in Japan, where the teacher relies strongly on the students both as a major source of information and as the initial evaluators of the effectiveness of the student input.

Many parents and teachers have shown great concern about the effects of tracking on children's self-esteem. According to those we interviewed, being placed in slow-learning groups may be interpreted by children as reflecting a deficiency in cognitive ability. Those placed in fast-learning groups may be teased by their peers for being "book worms." Members of minority groups whom we interviewed were especially critical of tracking because, they suggest, differences in language or cultural background may be interpreted as differences in academic ability and could result in the children's being placed in special education classes.

Gender and Tracking

An important decision faces students in all three countries as they consider which track they should enter. Traditionally, males were more likely to select science and engineering tracks and females were more likely to enroll in humanities or liberal arts tracks. More recently, efforts have been made in many countries to increase the representation of females in science and engineering. However, among the educators we interviewed in all three countries, it was generally agreed that these efforts have not been highly successful.

Japan. During the first 9 years of compulsory schooling, all students study the same curriculum, but once students enter an academic high school, they must choose between the science and the liberal arts tracks. Our observation and interview data show that a higher percentage of female students select the liberal arts track, while the science track is selected more often by males.

Teachers in the academic high schools indicated that students in both tracks take advanced mathematics courses, but the difficulty of the material and the number of class hours they attend is lower in the liberal arts than in the science track. This was not a matter of concern for most of the teachers we spoke to, who believed that the unequal representation in the two tracks by gender was a result of self-selection, based on students' perceptions of gender differences in ability and interest. According to one teacher, the gender differences in the two academic tracks was not considered a problem by most Japanese because the liberal arts track does not endanger the students' opportunities to enter a college or university.

Germany. According to the principals in the schools we visited, tracking students in secondary schools on the basis of their academic performance in fourth grade has led to fairly equal distribution of boys and girls in each of the three types of school. In one state, for example, females comprised slightly more than half of the students receiving their *Abitur* from *Gymnasium*, 52 percent of the graduates of *Realschule*, and 44 percent of the graduates of *Hauptschule* (Bundesministerium für Bildung und Wissenschaft 1993).

Within the three types of schools, however, the percentage of males and females in the various tracks differs markedly. Several curricular tracks exist within the *Gymnasium*, but the two that attract the most students are the mathematics and natural science track, in which males comprise the majority of the students, and the modern language track, which is dominated by females (BSME 1993).

Perhaps a more telling index of the gender differences in enrollment is the percentage of males and females enrolled in advanced courses in math during their last 2 years of *Gymnasium*. In our observations of advanced mathematics classes, the ratio of males to females was at least two to one, and in one school three to one. Females appear not to be pursuing an interest in mathematics to the same degree as males.

United States. Although parents and teachers said they believe that gender differences in mathematics and science have decreased over the past several decades, they also said there is a sizable difference in the enrollment patterns during high school for advanced level courses in these two subjects. Many explanations were offered for this gender gap, including differences in motivation, relevance of these subjects for future occupations, and parental support for taking the courses. Teachers' most frequent explanation for the decline in the number of girls studying mathematics during secondary school was the preponderance of male teachers in these courses and the lack of female role models.

Race and Tracking

Race is related to tracking in both Germany and the United States, but the racial homogeneity that exists in Japan keeps this from being a source of great concern.

Japan. Residents of Korean and Chinese ancestry may encounter discrimination in Japan, but a much more frequently mentioned minority group were the *Burakumin*, who differ socially but not racially from the general Japanese population. *Burakumin*, descendants of workers in trades that were considered undesirable, are found most frequently in certain neighborhoods in some Japanese cities. Because it is illegal to identify students as *Burakumin*, there is officially no way to relate their social status to enrollment in education programs. In conversations, however, there was mention of the difficulties these students face in attempting to enter certain types of education programs.

Germany. Germany has large numbers of foreign workers from a wide variety of countries, ranging from Greece to Somalia. In our interviews with teachers, they frequently mentioned that children of these workers often have difficulty in school and are overrepresented in the lower tracks. Teachers also stated that the low representation of these children in higher level schools is a result of many factors, including unfamiliarity with the German language, lack of home support for education, and lack of background for the content of the German curricula.

United States. High school students from racial minorities other than Asian Americans are overrepresented in vocational programs and underrepresented in advanced placement classes (USDE 1995). Vocational programs have been designed to provide graduates with well-developed skills necessary for entering the workforce. Unfortunately, these programs often have been criticized for their failure to provide the kinds of skills needed by potential employers. In addition to this impediment, we were told by principals and school counselors that counseling minority students about opportunities for careers requiring a college degree is difficult, because schools in poor neighborhoods do not have the course offerings that are sufficiently rigorous for qualifying the student for admission to a university.

Socioeconomic Status

When parents and teachers were asked about factors that influence education outcomes, the discussion nearly always involved the socioeconomic status of the child's family. The general argument was that a family's socioeconomic status influenced the family's support and interest in education which, in turn, influenced the child's interest in school and willingness to study hard. Reliance on socioeconomic status as an influential variable was less prevalent in Japan, where the Japanese regard their society as being relatively homogeneous. It was mentioned more often in Germany, primarily in reference to the growing numbers of children of foreign workers, and was frequently discussed in the United States, where neighborhoods and schools are highly stratified according to the socioeconomic status of the families.

Japan. Although there are differences in the socioeconomic status of families in Japan, schools actively discourage recognition and discussion of these differences. However, primarily in conversations about *juku*, teachers did mention the linkages between socioeconomic status and the ranking of schools, and between family income and students' achievement. Attending *juku* is expensive and the inability of some families to afford the high tuition was considered to penalize their children in their college entrance examinations.

Teachers pointed out that the advantages of a high income were evident in the level of education attained by students. "I don't have the exact data," one vocational school teacher told us, "but if you compare the family income of students who attend a university with those who are high school graduates and those who are middle school graduates, you will see a big difference." In this way, he continued, Japanese society was becoming more stratified by social class. Parents with higher incomes made it possible for their children to enter professions that ensured that they, too, would receive higher incomes.

These arguments were made not only in discussions of the situation believed to exist in urban settings, but also in discussion of urban-rural differences in the attainment of higher levels of education. Students in rural areas were often described by teachers as having fewer economic resources to continue their education beyond high school and to suffer from their inability to compete with students from large cities who were able to attend various after-school opportunities to review subjects included in the college-entrance examinations.

Germany. Just as the Japanese were concerned about the lack of opportunity of children from poor families to attend *juku*, the Germans we interviewed worried about the inability of poor children to attend kindergarten. As a result, parents were concerned that these children would not enter school with an appropriate readiness to learn.

To remedy these inequities, elementary schools in Germany provide supplemental instruction to students who enter school with deficiencies in academic, linguistic, social, and physical skills. Despite the schools' efforts at remediation, poor living conditions, lack of family support for education, and inadequate fluency in German were often cited by teachers as factors which kept students from performing at higher levels.

As a result of these problems, a disproportionately greater number of students from lower socioeconomic levels attend *Hauptschule*, the least demanding of the high schools, and enter lower-level vocational occupations (Arbeitsgruppe Bildungsbericht am Max-Planck-Institut [MPI] 1994). In contrast, parents who had attended a *Gymnasium* or *Realschule* indicated to us that they were aware of the opportunities that a high level of education would provide. These parents were able to encourage and assist their children, and to convey to their children the importance of aspiring to a high level of education.

United States. Several factors operate to produce great diversity among U.S. schools in their responses to individual differences among students. Foremost among them is the manner in which schools receive financial support. Schools in the United States receive nearly half of their funding, including that for teachers' salaries, from local tax revenues (USDE 1995). This means that schools, like the families of the students who attend the schools, have markedly different resources available for education. The influence of local decision-making also contributes to the striking differences between schools on policy issues such as tracking and retention.

In contrast to Japanese and German schools, where the same basic curriculum is presented at different levels of difficulty to students in the various tracks, U.S. students in well-supported schools have a greater variety of courses from which to choose. In addition, school bulletins, which listed available courses at the various high schools we visited, showed they have many more opportunities to take the courses that prepare them for the competitiveness they will face in attempting to enter high status occupations, while students in less well-supported schools usually do not have such opportunities. Similarly, the school's physical facilities, ranging from instructional equipment to the physical plant, may differ greatly among schools in different neighborhoods. In general, our observations revealed that resources were highest in middle- and upper-middle class suburban areas we visited and lowest in inner-city areas where families were living at or below the poverty line.

Students with Disabilities

Educators in all countries encounter students with mental or physical disabilities. Educating these students poses a difficult and expensive task. All three of the countries have institutions that offer special training to students with severe disabilities. Both the United States and Japan also have special classrooms within regular schools for students who have the social and physical skills necessary for living in a normal environment. More recently, efforts have been made in all three countries, especially in elementary schools, to include children with disabilities in regular classrooms.

Japan. All three types of arrangement (special schools, special classes, and mainstreaming) are available in Japan. Approximately 42 percent of the children who are judged to be in need of special education are enrolled in special schools and the remaining 58 percent attend special education classes in regular schools (Monbusho 1994). The inclusion of children with disabilities in regular classes was evident in nearly every school we visited, but the total number of children accommodated in this way remains quite small.

Children who are having difficulty with their school subjects may attend *hoshu* or *juku. Hoshu* are special review classes offered by regular teachers and are often taught at the beginning or end of the school day. These classes are open to anyone who wishes to enroll, but are required for students who have failed one of the regularly scheduled examinations. *Juku* offer several types of classes and among them are ones aimed at helping students who are having academic problems. The *juku* instructors, often former teachers, review the content of the textbooks and drill students in appropriate ways to analyze and solve problems.

Germany. Most students with disabilities attend special schools, called *Sonderschule.* Principals with whom we spoke, said that generally, children are recommended for *Sonderschule* by their families or by the public school they are attending. The child then undergoes a series of tests. Following these tests, the school superintendent consults with the parents or guardians and makes the decision whether the child should attend a *Sonderschule* or a regular elementary school.

In our interviews with teachers, they indicated that there is a movement in Germany to integrate students with disabilities into the regular school system, but that this seldom occurs. When it does happen, they indicated, the students typically are those described as dyslexic, learning disabled, or behaviorally impaired. Most schools do not have the facilities to handle physically disabled children.

United States. Public schools in the United States are required by federal law to identify and then provide special education services to all children with educational, emotional, developmental, or physical disabilities (Singer, Palfrey, Butler, & Walker 1989). The principals and teachers with whom we talked told us that children are examined by a multidisciplinary team that develops an individualized education plan for the student. Consideration is given in this plan to the student's current level of academic performance, the goals for the student, the evaluation of the student's progress, and the kind and duration of the services the student will receive.

The principals also indicated that arrangements for the implementation of special education services typically depends on decisions of the local school board and on the parents' wishes. In some schools, students with severe disabilities are mainstreamed into regular classrooms and receive special assistance from the special education teacher. In other schools, the children attend special education classes in separate classrooms.

Gifted Students

Another group of students often considered to need special forms of education are those judged to be gifted or talented. This is a controversial area in education. While it is relatively easy to gain consensus among educators and citizens that students with disabilities need special consideration, proposals to provide special classes for gifted and talented students often meet with criticism, as well as support.

Japan. The idea of separating gifted and talented students for special types of instruction is considered elitist by Japanese parents and school officials. Earlier in this century the opportunities to obtain an education in Japan were much greater for members of elite groups in society than for ordinary citizens. Anything that resembles a return to elitism is regarded as a violation of the principle that children should learn together as well as from each other.

Another reason for not providing special classes for gifted students was voiced by one teacher:

> It is more important to take care of those who are not doing well. Those who are doing well can study on their own if I tell them what to study.

Teachers said that because Japanese curricula are constructed with the average student in mind, gifted students often find that they are already familiar with the material being covered in class. Nevertheless, students are not allowed to skip a grade, nor are there special classes for these students. Teachers described how they often resolve this situation by assigning these students more difficult problems, suggesting that it is possible for students to move ahead on their own, and describing other activities in which the student might choose to participate.

Most of the students and parents with whom we talked supported the practice of not giving gifted and talented students special consideration. They argued that the goal of regular classes is to reduce the gap between advanced and less advanced students and violations of this goal would mean that teachers were discriminating among the students on the basis of ability.

Only during the high school years, when students are separated into different tracks, different curricula within these tracks, and different courses within these curricula, are gifted students provided opportunities to study in a more rigorous environment.

Germany. German schools make no effort during the elementary school years to provide special programs for gifted students. Some teachers discussed how they provide gifted students with extra exercises or additional homework, but they said the prevailing view was that all children's talents and abilities should be strengthened, and above all, students should learn to be part of a group and to help each other.

The tripartite education system of German secondary schools makes it possible, as do the divisions within Japanese schools, to assign the most gifted students to the most challenging track. The curriculum, standards of performance, and academic orientation of instruction in the *Gymnasium* are meant to challenge the best and brightest students. Although the *Gymnasium* does not have special programs for gifted students, especially capable students may engage in academic competitions, out-of-school seminars, and research. In rare cases, students are allowed to skip a grade.

United States. Programs for gifted and talented students were available in several of the schools we visited. The programs generally were developed by the school board and principal in response to needs expressed by members of the community. However, some teachers noted that not all school districts are positive about establishing such programs, regardless of the attitudes of the parents. Their main argument against organizing such programs was that it diverts financial resources away from remedial and other programs for which there is a greater need.

Two common approaches in U.S. programs for gifted students are enrichment of the curriculum and acceleration. Enrichment activities include visiting resource rooms, responding to supplements to regular classroom activities, and participating in special interest clubs. The possibilities offered to U.S. students for acceleration exceed anything that is possible in Germany or Japan. Students may enter kindergarten early and skipping a grade is possible. U.S. junior high and high school students who display special levels of giftedness may be allowed to attend university classes for part of the day or may even be admitted to a university early.

Perhaps the most common form of special opportunities provided to gifted students are the pull-out programs in which gifted students remain in regular classrooms for part of the day, but spend the rest of the day in other classrooms where they receive special instruction in subjects such as mathematics and reading.

Summary

Consideration of individual differences in academic ability leads directly to a discussion of a society's fundamental beliefs about human development. A major issue in these discussions concerns the degree to which individual differences are attributed to innate versus environmental influences. This ever-recurring nature-nurture controversy generates strongly held opinions.

The Japanese emphasis on the role of effort is in line with the long-held Confucian beliefs about the malleability of human beings, and little attention is paid to innate factors. In contrast, the more biologically-oriented German view holds that the primary influence is derived from inherited characteristics. In the United States the position is less clear. While not denying the importance of innate factors, the most frequent explanation of differences in academic ability offered by our U.S. respondents was in terms of experiences resulting from the degree of family stability and support for education.

Another fundamental belief that differentiated members of the three cultures was the priority given to the individual relative to the group. Japanese choose to ignore individual differences as much as possible, with the rationale that separating individuals according to their interests and abilities disrupts the development of close relations among students, a factor that is believed to be an important goal of education. Germans choose to stress the importance of the group for the first four years of schooling, but the emphasis then shifts to a structure which is based on the needs of individual students. U.S. educators appear to be much more likely than either the Germans or the Japanese to attempt as early as possible to discover differences among students. The purpose of these efforts is to discover problems that may impede the student's academic progress.

Regardless of the orientation of the society in the nature-nurture controversy or in the relative emphasis placed on the individual versus the group, members of all three societies recognize the importance of preparing all students during their early years of schooling by imparting basic knowledge in core subjects such as reading, mathematics, and science. However, all three societies eventually abandon the attempt to provide common academic experiences for all children and give much greater attention to individual differences. By the time students enter high school in all three countries they are separated into different curricula, depending upon their prior academic performance, their interests, and parental wishes.

While there are similarities among the three countries in the most general organization of education, the philosophical positions held by members of a society have a profound influence on the society's views on specific aspects of education, such as tracking, students with special needs, and teaching practices.

If differences in academic ability are considered to be primarily a result of innate factors, the goal of education is likely to be to discover these differences early and to respond to them by placing children in different academic tracks. This is the case in Germany, where an attempt is made on the basis of the child's performance during the first 4 years of school to assign the child to a track that demands no more of the child than the child is capable of learning. If, on the other hand, differences in academic ability are attributed to environmental events, justification is found for attempting to create experiences at school that are assumed to be most likely to bring all students to a comparable level of competence. This is the case in Japan.

The greatest effort to meet the needs of individual students appears to occur in the United States. Special schools, programs, and classes have been established in many school districts in an effort to accommodate elementary school students who depart from the norm in terms of their physical and psychological characteristics. After the elementary school years, there are programs in all three countries of varying length, depth, and emphasis for responding to students with special needs. The most extreme cases are enrolled in special schools, but efforts are made to include children with less severe disabilities in ordinary schools. This is accomplished in Germany through the organization of schools that have markedly different standards, ranging from the rigorous *Gymnasium* to the less-demanding *Hauptschule*. In Japan, an important distinction is made between gifted and talented students and those who have learning, perceptual, or other types of disabilities. Providing separate treatment for gifted and talented students is believed to violate the widely accepted goal of avoiding any type of elitism in the public schools. In the past, special treatment for students with disabilities was not considered to be an obligation or responsibility of the schools in Japan. More recently, efforts have been made to establish special education programs in Japanese schools. In the United States, the curriculum within general purpose high schools includes courses of different levels of difficulty and special efforts are made to develop special curricula and to assist students with problems by placing them in special classes for part of the day.

Beliefs about the value of whole-class teaching differ to a greater degree among the three countries than does the actual form of teaching. Even though efforts have been made during the past decade to reform teaching practices in the United States by offering more individualized instruction, the typical pattern in the classrooms we visited continues to be that of a teacher assuming the role of primary purveyor of information to the whole class. In Japan, it is argued that whole-class teaching is a preferable form of teaching because it exposes all students to the same materials, enables students to consider the more effective and less effective responses, and allows teachers to act as knowledgeable and experienced guides. The manner in which the classroom is organized was less often a topic of discussion in Germany, although throughout all the years of school the major form of instruction in the various types of schools is through whole-class teaching.

It should be pointed out that in the Third International Mathematics and Science Study the scores of the eighth-grade students in both science and mathematics in the United States and Germany were significantly below those of students in Japan. The degree to which these differences are a result of the society's responses to individual differences in academic ability is a matter for further consideration. However, there was agreement in all three countries that the increasingly complex demands of everyday life mean that all students must be provided with the knowledge and skills necessary for becoming a member of adult society and for finding satisfactory employment.

Chapter 4

The Place of School in Adolescents' Lives

"I think with high school kids, their first priority is friends. They might be into school and everything, but I guess they are more into friends. School would probably come second."

(Student in U.S.)

"I would say that once the kids get to the junior high level that parents in this community feel more comfortable leaving the child in the hands of the school professionals and kind of backing off. The parental role is not visible, especially at the high school level."

(Parent in U.S.)

"The school plays a very great role in students' lives because they find their friends here."

(Teacher in Germany)

"It is not school inself that plays the largest role in the students' lives'; rather it is the certificate they get from school. This will make a great difference in their future lives. This piece of paper will determine which avenues are open to them in the future—whether it is, for example, an apprenticeship in a bank or university studies."

(Teacher in Germany)

"School is a place to make friends. A place to contact others. There is also studying, but meeting friends."

(Student in Japan)

"If they just study they won't have much humanity [personality]. It is best if they can combine the two: study and developing humanity. I think that is necessary for education at the junior high school. They should concentrate on more than just studying at this time of life. They need to learn to be in a group. Junior high school is a time when children need to learn how to make friends."

(Parent in Japan)

Once the elementary school years are over and children become adolescents, school takes on a different meaning in their lives. Japanese students, beginning to prepare for the demanding high school entrance examinations, are often described as losing the exuberance they displayed during their earlier years. German students are already separated into clearly defined tracks and are traversing routes that lead to different life courses. U.S. students leave the intimacy of their elementary school classrooms and enter classrooms of large junior high and high schools with different teachers and ever-changing groups of students. It is a time of transition, a time when students are faced with important choices about their lives at school, at home, and in society.

In organizing our approach to this topic we consider four major topics. First, we explore the time adolescents spend in academically-related endeavors compared to the time they are involved in nonacademic activities. A second perspective in which we are particularly interested concerns adolescents' responses to education. What does getting a good education mean to adolescents? What do they and their parents perceive as the practical benefits of an education? A third set of questions deals with what happens when students leave school. By the time students finish their secondary school training they must either be qualified to enter a university or to find a job. Adolescence as a period of transition is potentially a source of great stress and we ask whether this is equally characteristic of adolescents in the three cultures with which we are concerned. In a final section of the chapter we attempt to describe the kinds of external influences adolescents experience with their friends and parents and how these in some cases lead to healthy adjustment and in others to deviant behavior.

Time Use

For adolescents in all three locations, school occupies a significant portion of their everyday lives. For many, school is not only about classes, but is also the hub of an active life; it is where they meet friends and socialize, participate in sports, pursue personal interests through extracurricular activities, try out various social roles, and express themselves through their appearance and behavior. After-school time fits into a complex schedule of social life, studying, jobs, and leisure activities. The centrality of school in the daily life of adolescents is greatest in Japan. German students, in contrast, are expected to be at school during specified hours of the day, but the relationship of school to a student's social life may be tenuous. For U.S. students, the time spent at school and the importance they assign to this time in their life varies greatly among schools and among individuals within the schools.

Japan. Japanese students have a long school day. Arriving at school shortly after 8:00 a.m., many students leave at 6:00 or even later in the evening. It is a mistake, however, to consider these long hours as reflecting time spent in academic courses. The daily schedule of classes departs no more than an hour from that found in many other countries. It is in the after-school activities that the major differences arise. Japanese junior high and high school students are expected to participate in one of the school's clubs. Some Japanese students remain after school to study together or simply for social interaction. The picture of Japanese secondary school students returning home mid-evening may reflect the time spent in a game of soccer or in talking with friends rather than in academic activities.

Japanese teachers we interviewed also express a positive attitude about clubs because they believe that participation in clubs leads to a well rounded and healthy person. For teachers who see their obligation to foster the social as well as the academic development of students, clubs are considered to make an important contribution.

Germany. School begins each day between 7:30 and 8:00 a.m. and lasts until 1:00 or 1:30 p.m. Most students return home after this and eat lunch. During the school day, however, students in the different types of schools do not have the same number of lessons. Depending on the state, the type of school, and students' year in school, they may attend from 30 to 36 lessons per week. The larger numbers occur for students in both vocational and academic *Gymnasium*. Vocational students have a heavy schedule because, in addition to the regular *Gymnasium* classes, they must also attend classes in vocational studies and economics. Students in the academically-oriented *Gymnasium* are likely to enroll in a large number of courses to improve their preparation for entering a university.

United States. The length of the school day is fairly common across the United States. Most of the students we interviewed described a formal school day of 6 to 7 hours. A typical pattern was from 8:00 a.m. to 2:30 pm. Junior high and high school students usually attended six or more classes a day, and moved from class to class, changing teachers each period. Classes typically lasted between 40 and 50 minutes, with a brief time between classes for getting to the next class. Students were usually expected to stay in the school building once they arrived and to eat lunch in the school cafeteria during a brief lunch period (generally no longer than 30 minutes). Students often could arrive before school hours or stay late for extracurricular activities.

Extracurricular Activities

Japan. Extracurricular activities in the form of clubs play a central role in the education of Japanese adolescents. Most schools offer a wide range of club activities, such as broadcasting, Japanese fencing, calligraphy, cooking, flower arrangement, Chinese chess, sports teams, band, and computer programming. Teachers proposed that there is a strong link between participation in clubs and success in academic classes. According to their teachers, students who do well in clubs tend to be serious and diligent, characteristics teachers deem to be important for achieving academically.

First-year students in Japanese junior high schools are required to take part in club activities and the majority continue to participate voluntarily after their first year. According to teachers we interviewed, over half of the students spend 2 to 3 hours per day in school clubs and the vast majority go to clubs more than 3 days a week. However, the entrance examinations that loom before third-year junior high school students reduce the time they have available for clubs. Participation is variable during the high school years. Studying for college entrance examinations, working after school in the case of vocational high school students, and other interests displace participation in clubs for many high school students.

Germany. Some German teachers expressed ambivalence about extracurricular activities. Although most teachers valued the teamwork and social skills that students might develop through such activities, some *Gymnasium* teachers placed the blame for what they perceive as declining academic standards on the time these activities take away from studying. There was general agreement among almost all of the teachers and students with whom we spoke in other types of schools that more extracurricular activities should be offered, but they acknowledged that lack of financial and human resources seemed likely to make this impossible.

The average school organizes three or four extracurricular activities. Depending on the school and the interest of teachers, schools might sponsor a student council and political or cultural activities. The most common activities listed in school bulletins, however, were musical (e.g., choir and band), athletic (e.g., soccer and basketball), or esthetic (e.g., theater, photography, or newspaper production).

United States. U.S. respondents pointed out several contributions of extracurricular activities to adolescent development: they stimulate and broaden students' interests, occupy leisure time, provide opportunities for socialization, and—importantly—enhance the students' qualifications in college-entrance applications. A review of the school bulletins from the various schools we visited showed that schools in affluent school districts offered the most activities and the range was great, including programs aimed at academic enrichment, such as the Science Olympiad, academic decathlons, and mathematics competitions, as well as more traditional activities such as sports teams, musical groups, and publication committees. Some of the inner-city schools we visited had dance clubs and sports teams that played important roles in the students' daily lives. In other inner-city schools there were few after-school activities, primarily because of a lack of financial resources, but also because teachers and students were reluctant to stay after school in unsafe neighborhoods.

Some students told us of their pride in the time spent on their extracurricular activities and of the friendships that grew from common interests and shared experiences. Other students, knowing that they must distinguish themselves from others with similar academic records, said they have participated in extracurricular activities because they believe it will improve their resumes and strengthen their college applications.

Out-of-school Instruction

Japan. The primary form of after-school instruction in Japan is through *juku*. Exact data concerning the percentage of Japanese adolescents who attend the classes taught at *juku* are hard to obtain. *Juku* are privately owned and competition for students makes it undesirable for all but the most successful *juku* to reveal yearly statistics about their success in attracting students. However, teachers indicated that attendance depends on the region of the country in which the student lives, the size of the city, and the student's grade level. Attendance is greatest in large cities, especially those on the corridor extending from Tokyo to Nagoya, and during the last year of junior high school. Junior high school students enroll in courses that review or enrich their schoolwork or that prepare them for the high school entrance examinations. High school students are more likely to study for the college entrance examinations by themselves, but some do enroll in courses focused on the college entrance examinations or that are more advanced than the courses available in most high schools. In addition to *juku*, junior high school and high school students attend *hoshu*, the extra classes organized by teachers as a seventh period in the school's daily schedule to help students do well in their high school or college entrance examinations.

Germany. Although private preparatory courses for the *Abitur* and other formal examinations exist, student attendance at academic classes outside of school is uncommon. Preparation for the *Abitur* occurs through individual studying, and among *Gymnasium* students, through after-school instruction for grades 11 through 13. Students attending these after-school classes remain at school until 3:00 to 5:00 p.m. several days a week. In addition, teachers in the 13th grade (12th grade in some states) may offer students in their advanced courses opportunities for study and review outside of school. Some *Gymnasium* teachers host weekend excursions where they conduct intensive review sessions in preparation for the *Abitur.* Peer-tutoring groups also are organized at most schools.

United States. According to school guidance counselors, increasingly large numbers of students enroll in review courses conducted by private companies, but the courses are expensive and attendance is limited to families that can afford the fee. Schools seldom organize review sessions for students, as is frequently done by teachers in German schools, and, for the most part, students are left on their own to study commercially published books containing cues about how to take the examination, summaries of important concepts, and examples of examination questions.

After-school Recreational Activities

Japan. Few Japanese students are enrolled in organized recreational activities other than school clubs.

Germany. In Germany, where secondary schools seldom sponsor intramural or interscholastic sports teams, over three-fourths of the students participate in sports clubs sponsored by their neighborhoods or communities. The only other organized recreational activity described by German adolescents was dance clubs, which many families consider to be part of the "cultural" education of students.

United States. How U.S. adolescents spend their time after school depends on the availability of community activities, personal interests and aspirations, family finances, parental involvement, and the influence of peers. Some students lead remarkably complex out-of-school lives; others may focus on one or two activities; still other students may seldom engage in organized activities outside their school.

For students in wealthier neighborhoods, there is an array of after-school activities from which to choose or, as is often the case, in which parents encourage their children to participate. Middle school teachers in these communities told us about students who miss school for activities the parents believe take precedence over their schoolwork. According to their teachers, the result is that students often feel pressure from their parents to keep up with the demanding schedules and to meet parental expectations that they will distinguish themselves in areas of individual talent and interest.

According to parents, participation in after-school activities occurs because the parents believe this will keep their children "off the streets" while the parents are at work. Other parents are enthusiastic about organized after-school programs because of the worthwhile activities they provide. The opportunity for students from disadvantaged families to participate in many of these organized, out-of-school programs can be seriously limited by their inability to buy the necessary equipment for participation or to pay the fees that many activities require.

Homework

Japan. The close equivalence between doing "homework" and "studying" that exists in the United States is not shared by countries such as Japan. In Japanese, homework (*shukudai*) refers only to the time spent completing the assignments made by the teacher rather than the amount of time spent studying (*benkyo*). In addition, students may consider the time spent in preparing for lessons and reviewing class material (*yoshu*), or in answering practice questions (*renshu mondai*).

While the amount of time spent doing "homework" may be very modest, the time spent studying is not. Teachers informed us that by the time students enter junior high school they are expected to study every evening, whether or not they have been assigned homework. After completing their homework assignment, if there is any, it is expected that they will review the current day's lesson and study for the next day's lesson in anticipation of what will be presented in class.

It was clear from our interviews with both students and teachers that the amount of time Japanese students spend studying depends on the type of school they attend and their grade. Students generally study longer in the first year of junior high school and high school, when they are getting used to their new school, and in their third year, when they are preparing for entrance examinations. About a third of middle school students we interviewed said they studied one hour or less each day, and nearly 40 percent said they studied between 1 and 2 hours. By high school, academic high school students said they studied from 2 hours a night for ordinary school days to very intensive studying of up to 6 hours a night before the examinations. The role of homework in the three cultures is summarized in table 9.

Parents and teachers believe studying is a very important aspect of the adolescent's development beyond the knowledge that it provides, for it instills discipline, persistence, and dedication, attributes admired by the Japanese.

Table 9—Homework

Grade	Japan	Germany	United States
4	- Not assigned. - Drill books sometimes recommended.	- Very little, 10–15 minutes per day maximum.	- Varies according to school policy and individual teachers.
8	- Several hours of study every night. - Homework is a mix of assignments, self-directed study and review.	- Depends on type of school. - *Hauptschule* students receive less than *Realschule* or *Gymnasium* students. - Most *Gymnasium* students report 1–2 hours per day.	- Amount varies widely depending on school.
12	- Extensive self-directed study, especially for college-bound students.	- Very little at vocational schools. - *Gymnasium* students begin heavier course load which can increase homework to more than two hours per day.	- Frequency and amount depends on status of school: low, middle, high achieving.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–95.

Germany. According to our interviews with students at the various types of schools, students in the upper grades of *Gymnasium*, compared to students in the other types of German schools, spend the most time on homework, typically between 2 and 3 hours a day. In contrast, students in *Hauptschule*, *Realschule* and *Gesamtschule* said that their homework assignments ranged from "none at all" to "an hour at most."

Parents of *Gymnasium* students often commented to us about the extent to which homework occupies their children's time. They said that their children had little time beyond that expended in preparing for the *Abitur* and in attempting to do well in their courses. The students' teachers, however, commonly suggested to us that students do not do enough homework.

United States. According to our observations and interviews, it is increasingly common in both middle schools and high schools that homework is done at school and simply represents work that teachers expect to be completed before the next class meeting. Teachers may provide class time for this, and students may make use of study halls, lunchtime, and other free time to complete their assignments. Accordingly, statistics describing the amount of time spent on homework need not indicate time spent after school or at home on this activity.

One of the teachers in a disadvantaged school explained why she did not assign homework:

> I don't include much homework. A lot of the time I have no choice because we only have one set of books for the 160 to 175 students that I teach, and they can't take the books home... We really just have very little resources. When I did give out homework, I found myself losing books. I was also setting students up for failure because they wouldn't do it.

Students in the college preparatory track typically have more rigorous assignments and expect to spend more time on homework than students in vocational tracks. They estimated that they spend up to 3 hours a night and 3 or 4 hours on weekends doing their homework.

The lack of homework assignments was lamented by both parents and teachers we spoke to. Parents questioned how their children could complete their homework during school hours, a very different practice from what they experienced during their own school days. Teachers expressed their concern about the tendency of students to equate homework with studying; if there was no homework assignment, there was no studying. Even more important in many teachers' views was their impression that many students seem uncertain about what studying entails, demonstrate a limited repertoire of strategies for studying, and are not prepared to do academic work other than short assignments outside of class.

Out-of-School Social Life

Japan. The expectation of Japanese parents and teachers we talked to is that students' social needs can best be met at school under adult supervision. They, as well as the students, also agreed that dating does not play a part in the lives of the vast majority of junior high students. In fact, dating was forbidden at all of the junior high schools we visited. At this age, parents reported, students meet only in groups to "chat" after school, or go to each other's homes to study.

Dating is not uncommon during the high school years, even though it technically violates school rules. However, the increasing independence and mobility of high school students makes it difficult for schools to enforce this rule except to forbid public displays of affection on the school grounds. The most commonly observed dating behavior for both junior high and high school students was studying together at public libraries on weekends.

Germany. School is not the primary locale for the social life of German adolescents. Rather, the students said that they "hung out" with their friends during leisure time. "Hanging out" usually means going to a discotheque, bar or cafe, shopping, or playing sports. Eighth-graders are more likely to play sports; high school students more often go to a bar or discotheque. The legal drinking age in Germany is 16, but it is not uncommon for adolescents as young as 14 or 15 to go to a bar or discotheque with their friends. Other popular activities included listening to music and watching television and videos.

Many older students attending a *Gymnasium* said they did not watch television frequently, but preferred instead to go to the cinema with friends. Rental videos are common, and many students said they watched several videos each week. Teachers also noted that many students, mostly males, spend large amounts of time in front of home computers, using the computers to play video games rather than as aids to their studying.

The majority of adolescents were quick to stress that they have a boyfriend or girlfriend with whom they share some of their leisure time. For eighth-graders, it is often the case that the boyfriend or girlfriend is part of a group of friends who go out together. High school students are more likely than junior high school students to have a steady partner with whom they spend nearly all of their leisure time, engaged in the same kinds of leisure-time activities in which the other students participate.

Membership in a clique is an important part of adolescent social life, especially in western Germany. It was not clear in our discussions with students, however, that all students meant the same thing when they referred to a clique. Definitions varied from a group with a common ethnic identity, such as Portuguese or Moroccan students, to three or four friends who go out together. Not all cliques are harmless social groups. Several teachers mentioned that there are cliques that are more like gangs in that they are known for vandalism and robbery.

United States. U.S. students spend widely different amounts of time interacting with their peers after school. For many, it is a routine part of after-school time, relaxing and talking with friends, perhaps playing sports together. However, among the more studious students, weekday afternoons and evenings are devoted primarily to school-related activities, with the weekends providing time for social interaction.

Some academically-oriented students described combining studying with their social life. For others, particularly the less studious or those less involved in school, "hanging out" with peers routinely occupies their after-school hours. For boys, this was likely to mean playing sports; for girls, talking on the telephone. For the younger students the time was spent in like-sex groups, but interactions for older students were more likely to occur in mixed-sex groups. When older students talked about their social life, it often included weekend "partying." Particularly at high schools this included the use of alcohol and drugs.

Parents and teachers seemed to be unclear about the details of their students' social lives. Both agreed that dating as it was known a generation ago has clearly changed. One teacher described it briefly:

> Dating as something proprietal is not as important. 'This is the one and only' is much less pronounced.

Employment

Japan. Secondary school students in Japan are expected not to work. This expectation is sometimes violated by students who obtain part-time jobs, but it is rare to find students spending more than a small number of hours a week working. Students enrolled in evening classes or attending vocational high schools are an exception.

Germany. As in Japan, few high school students in Germany have jobs. Parents generally do not believe their children should work while they are still in school. Rather, they believe their child's role as an adolescent is "to be a student, to do his homework, and to socialize with his friends." Teachers also spoke disapprovingly of students working while they were in high school:

> I think it is a mistake for kids to take a part-time job during the school year. It's OK to work during vacations, but I think that they should concentrate on school during the week.

Many parents had the same opinion.

The exceptions, of course, are vocational school students who are employed part time throughout the school year in apprenticeships that are an integral part of their vocational school experience. Students in vocational *Gymnasium* do not serve as apprentices, but their teachers stress that their students are "vocationally oriented" and encourage them to find meaningful part-time employment. A high percentage of these students follow this advice and take jobs to gain real-world experience, especially in areas such as computer technology, electronics, and applied mathematics. These part-time jobs pay well and are of value later when the student is seeking regular employment.

United States. Part-time jobs are common among adolescents in the United States. Such employment serves as a means of earning money and as a symbol of growing independence and quasi-adult status. Even junior high school students spoke of a variety of jobs, including baby-sitting, mowing lawns, and delivering newspapers.

Many parents support the value of working at a young age. Even though it may not be financially necessary for their teenager to work, these parents suggest that working helps adolescents develop a sense of responsibility, independence, and a feeling of being grown up. Not all students want to work, nor are all students successful in finding jobs. Students told us that those least likely to be interested in employment were students from upper-income families who were highly involved in their academic work and students who were engaged in sports.

The jobs held by adolescents are primarily in service roles and retail sales, positions characterized as being monotonous and low paying. As a result, it is not uncommon for students to work sporadically, moving from job to job. Those employed in more professional environments often described these positions as being in the family business or positions arranged by their parents.

Time with Family

Japan. Once students enter junior high school they spend much less time at home with their families than they do in school. By the time they are in high school the complicated schedules of the children and their fathers mean that the family seldom has the opportunity during the week to get together, even for evening meals. Japanese parents tolerate this situation, but they also express the desire for the family to engage in some type of recreation together. For working-class families, as well as middle- and upper-middle-class families where the father works in another part of Japan, finding a time for family interaction is extremely difficult.

Germany. Several teachers asserted emphatically that one of the most serious problems facing German adolescents is that their parents are too busy with their own careers and personal lives to invest sufficient time and energy in their children. A *Gymnasium* teacher said,

> Many parents are trying hard to maintain their level of material success at the cost of neglecting their children. Children are growing up on their own.

Girls often described having a close relationship with their mother, routinely discussing what is happening in school and in their personal lives.

Boys were less likely to say that they talk with their parents about personal issues, but did keep their parents informed about their progress and performance in school. These conversations often occur at meals, which serve as a forum where concerns are discussed and problems are resolved.

United States. In describing their daily routines, many U. S. students mentioned time with parents and siblings. Although the busy lives of family members prevent many from arriving home until late, the family dinner still takes precedence in many homes, at least on certain nights of the week. For example, "We always have a pizza together on Friday night."

Parents attempt to compensate for the interference in family life that these busy schedules produce. "I'm on many committees," one mother told us, "so a lot of times I fix food ahead of time, and my 17-year-old can feed the youngest one if I'm not at home." An eleventh-grader who practices sports for nearly three hours a day explained the difficulty members of his family had in communicating with each other:

> Everyone is so busy and when my parents come home they are so tired. I always come home late. By that time they already ate. My older brother, he is older and he is going to the university, so he eats at different times. My mother and dad eat together.

Some of the younger adolescents told us about how they followed regular routines, spending as much time as possible with their families. For those whose parents are separated or divorced, the weekend often means living with the non-custodial parent or with other relatives. Many African-American and Hispanic students described regularly scheduled time with their extended families on weekends, frequently mentioning Sundays as being a day spent routinely at an aunt's or grandmother's.

Response to Education

According to teachers and parents of students whom we interviewed in all three countries, students' levels of motivation to succeed in school was often related to what the student was studying and to the student's year in school. Those taking advanced courses or attending prestigious schools generally appeared to be more highly motivated to succeed than were students enrolled in vocational schools or regular classes. Another important factor related to students' attitudes about school was their perception about how gaining a secondary school education was related to possible career choices and to other options available after graduation.

Japan. Teachers linked active club participation with a positive attitude about school. The idea of devoting a great deal of energy to club activities is part of the expectation that junior high school students must study hard and play hard. Japanese students generally enter junior high school with a positive attitude, knowing that they are not only expected to study hard, but also to play hard. Participation in club activities offers ample opportunities for the latter. Teachers support their students' participation in clubs, for they link active club participation with a positive attitude about school. Gradually, the excitement of attending junior high school diminishes and students begin to express a sense of disenchantment with their studies. This is often the result of the differences in instruction that students encounter as they move from elementary to secondary school. The increased pressures for teachers to cover all the material in the high school entrance examination leads to a change in the teachers' instructional style. No longer do the teachers follow the interactive approach characteristic of elementary school teaching; they often begin to adopt the lecture format of many high school lessons. By the last year of junior high school, students begin to complain that there is too much to learn in classes, that the pace of the lessons is too fast, and that many teachers do not seem to care if students understand the material or not.

A relatively small percentage of Japanese students react during the later years of junior high school by exhibiting "school refusal," and by staying at home for weeks or months at a time (Monbusho 1993). Students who exhibit this behavior are likely to be doing poorly in school and believe they will not be admitted to an academic high school. These students are at risk of dropping out of school completely at the transition to high school or after they have been in high school for 1 or 2 years. The percentage of students who actually fail to graduate from high school is low (Monbusho 1993), but the number of students who have a growing sense of inferiority about studying and taking tests increases with each grade in high school.

The academic expectations of Japanese high school students depend on the type of school they attend. Students in highly rated academic high schools are oriented toward entering college, and preparation for the college entrance examination is the focus of their high school years. Students in vocational high schools regard themselves as being at the opposite end of the academic ladder. Because they will enter the labor force immediately after graduating from high school, their studies are given a much less important role than working at a part-time job.

Students attending the middle tier of high schools vary greatly in their motivation about school. Some seniors in these high schools attend extra courses at night to prepare for the college entrance examination and others spend their free time, for example, in driving school.

Germany. While most German adolescents said they like school, there were also those who said they consider school to be a burden in their lives. One 18-year-old said he was "torturing himself" by staying in school and taking the

Abitur and was doing so only because he had already invested so much time and energy in school.

A complaint made by the majority of the students we interviewed dealt with the fact that attending school is obligatory. Many considered school to be a place which imposes a steady stream of demands on their time and where their performance is judged critically. For many, school is considered to be a stressful place.

These negative impressions of school did not characterize all students. Many said that they enjoyed interacting with their peers and teachers and reported that they had a great deal of respect for teachers, who they believe have a difficult job. The teachers they described as receiving the greatest respect were those who were the most effective in maintaining discipline and order in the classroom. Students were overwhelmingly supportive of strict teachers. However, they also emphasized that teachers should not be authoritarian and must treat students with respect.

Despite any unenthusiastic attitudes students may express about school, students and parents were aware of the strong link between school performance and vocational options. Students attending *Hauptschule* or *Realschule* are generally clear about their career options and limitations and about the kinds of grades they need to earn in order to achieve their goals. *Gymnasium* students were also aware that both their school grades and the results on the *Abitur* examination contributed to their final *Abitur* results, and that these results were extremely important to their acceptance by highly competitive university programs and therefore also for future career goals.

United States. U.S. students are most likely to see the purpose of education in pragmatic, general terms. They believe the diploma is necessary for a job and that doing well in school will ensure admission to college. At the same time, they rarely spoke about how their courses might prepare them for any particular kind of work.

The involvement of U.S. students in school varied greatly, depending on their perception of the function of school. A high school student described the situation in the following way:

> The range of involvement in schooling varies because some people's focuses are placed in schooling from the time they were very young. Other kids grew up with lives where, you know, you do not really need school. It is just something you have to do. Different experiences make you focus on different things.

Teachers play a critical role in influencing students' attitudes about school. Students spoke enthusiastically about teachers who make learning fun and interesting, who like teaching and students, who have control of the classroom, and whose instructional repertoire includes more than lecturing. In contrast, students were critical of classes that were boring, that were taught primarily through lectures, and that were oral recapitulations of the content of their textbooks.

Some of the most positive comments about schooling came from students in honors or advanced placement courses. Another group of students who were enthusiastic about school were those who attended well-funded schools. These students were often aware of advantages offered and expressed appreciation for the range of extracurricular activities in which they had an opportunity to participate. However, students in poor school districts complained about the inadequate number of courses and activities available to students. For example, one student noted that "our district doesn't have much money compared with the districts on the other side of town, so our school district, they took all the sports away." Comparable stories were cited in other schools.

Not all students were positive about their schools, and many had criticisms and recommendations for change. The criticisms focused on safety, school rules, activities, classes and teachers, and the effects of tracking. These concerns were mentioned with consistency across the cities and schools we visited in the United States. One of the students' most serious and worrisome criticisms concerned their own safety. At some schools we visited everyone entering the school, including the students, must pass through a metal detector and the scrutiny of several security officers. Students in these schools expressed anger and anxiety about the gangs in their schools and the sense that the situation continues to deteriorate.

Finally, great concern was expressed by peers and parents of students who are labeled and placed in low-level courses. One African-American senior said that she thought some students were perceived as being stupid and put in certain classes accordingly, passed from year to year, and given diplomas that meant nothing. Others, she noted, were really quite bright, but were labeled as behavior problems, considered stupid, and placed in low-level classes. "Someone needs to pay more attention to those kids," she concluded.

Transition from High School to Work

Academically successful high school students in all three countries usually plan further study before entering the labor force. Those who are less successful in their schoolwork typically join the labor force immediately after graduating from high school. We dealt primarily with the latter group.

Japan. Apprenticeships organized by the government or schools are rare in Japan and vocational high school students usually gain work experiences through part-time jobs they arrange on their own. Students' reactions to their part-time jobs are generally positive. They welcome the opportunity to acquire work experience, to develop a sense of independence, and to feel they are contributing to their family's income. Parents approve of these arrangements and welcome the contribution from their children.

Even academic high school students express a desire to find part-time employment during high school. This symbolizes for them, as well as for the vocational high school students, the independence to which Japanese adolescents aspire. However, their demanding schedules at school permit few students in academic high schools to have the time for any type of job.

Japanese vocational school students must work hard and maintain a good school record if they are to enter a secure and well-paying position. Well established connections between schools and businesses are the primary avenue to jobs following graduation and companies seriously consider school recommendations in hiring students. Once they are employed, typically in entry-level positions in offices, factories, businesses or laboratories, the agency for which they work provides training in job-related skills. For most Japanese adolescents, companies are where school life ends and working life begins.

Germany. Vocational apprenticeships are the most frequently attended form of upper-secondary education in Germany, with over three-fourths of German adolescents attending such a program following graduation from a *Hauptschule, Realschule,* or *Gesamtschule* (KMK 1993a). During the 2 or 3 years of their apprenticeship, students spend 1 or 2 days a week at a vocational school attending classes and work more than half time as apprentices. Reactions to the apprenticeship programs are generally positive. Parents, teachers, and students said that they consider them to be an excellent basis for learning a trade, and see the certification which students earn as guaranteeing that they are qualified for employment in a particular job or profession.

Students who have received the best records in their schools are able to choose the most desirable apprenticeships. *Hauptschule* teachers confirmed that students with a diploma from *Hauptschule* have few options available to them other than to take an apprenticeship in a trade involving manual labor. *Realschule* graduates, who constitute the greatest number of apprentices, can choose from a wider variety of professions. Joining *Hauptschule* and *Realschule* graduates as apprentices is an increasing number of *Abitur* holders who also apply for apprenticeships in business and service industries. They do this on the assumption that the practical experience provided by a professional apprenticeship, followed by a university degree, is the surest route to a secure future.

German students can easily plot a course from school to work for any type of career, because of the ready availability of information about vocational decision-making. Schools have one or more teachers designated as career advisors, and students can read "career information brochures" distributed by the federal government. The brochures include information about requirements for entering a particular profession, the types of employment that are available, potential for income, and opportunities for further information that exist in the approximately 380 recognized professions.

Once certified in a particular field it is difficult to change professions. This usually would require starting over and completing another academic or apprenticeship program.

United States. Little is done in the United States high schools we visited to prepare students for entry into the world of work. Students lack information about careers and are unaware of what is needed to achieve their career goals. For example, one student who wants to be a doctor regarded "Decent grades. No D's and no F's" as the requirement for entering medical school.

Most U.S. adolescents must rely primarily on themselves in making a successful transition from school to work. They face many obstacles, including the fact that the jobs they hold during their adolescent years are low-paid, entry-level positions that few plan to continue after they graduate. Attaining proficiency in a profession is also limited by the fact that apprenticeships are rare. Finally, we heard of few vocational schools that link students' high school training with jobs in local industries.

Most U.S. high schools measure their success by the number of their students who enroll in colleges and other forms of post-secondary training, rather than by the number of students who enter the workforce. As a result, most adolescents view college as a stepping stone to a profession and teachers are reluctant to advise students not to go to college.

Parental Influences on Adolescents

Japan. The main way in which Japanese parents become directly involved with their children's education is through parent-teacher organizations. These organizations attempt to attract parents to their child's school through several meetings a year, newsletters, and events like school festivals. These approaches, successful during the early years of school, are difficult to maintain during high school except on occasions that are related to students' future academic performance. Although interest is higher among parents of highly ranked schools, even they place more and more responsibility for academic activities on their children and express reluctance to be directly involved in their children's life at school.

Parents of secondary school students are often unable or reluctant to try to help their children with their schoolwork. Because most parents are unfamiliar with the content and format of their children's lessons, those who are able to afford it tend to turn over many of the responsibilities for helping their children to *juku* instructors. Thus, the image of demanding Japanese parents hovering over their child every evening, insisting that the child complete his or her homework, was not one that we encountered. More typically, parents attempt to provide a healthy environment, to purchase the necessary books for study and practice, to make few demands on the teenager's time, and to convey their high expectations. These expectations are not limited to academic achievement, but also include character building, interpersonal and communication skills, and social responsibility.

Germany. At the secondary level, parental support for education often takes the form of providing a safe, quiet home environment for their children. Although they do not attempt to help their children with their homework, interested parents check to see that it is done.

Teachers said that the degree to which parents are involved in their child's education often depends on the type of school in which their child is enrolled. For example, they said that parents of *Gymnasium* students are more likely than parents of *Hauptschule* and *Realschule* students to be involved and to convey the importance of achieving an education. *Gymnasium* teachers reported that they have nearly perfect attendance at parent-teacher meetings, while *Hauptschule* teachers said that attendance at parent-teacher meetings is sparse. This lack of involvement by parents of *Hauptschule* students is a source of irritation to some of the teachers we met. They complained that many parents are too busy to spend time with their children after school to make sure that they do their homework, and to convey the importance of education by taking an interest in their child's school day.

United States. In the United States, parental involvement in the education of children varies, and is often related to the economic and ethnic backgrounds of the parents. Involvement is difficult for those who work full time or have little fluency in English. They depend heavily on the system to educate their child. "They put their trust, they put their hope in the school," said one principal.

Parents who either attended college or wished they could attend but were unable, have strong expectations that their children will continue their education after graduating from high school. One female senior student described it this way: "Going to college is an absolute necessity. There was never a choice; it's expected."

In addition to stressing the importance of gaining a college degree, most parents display their involvement in their adolescent's education in ways similar to those observed in Japan and Germany: attending parent-teacher meetings, and reading newsletters and parent handbooks.

Many parents were concerned with the broader social development of their children in addition to their child's academic achievement. Independence, individuality, and well-roundedness were cited as the characteristics they hoped their children would gain through schoolwork and participation in the school's extracurricular activities. These characteristics are considered by parents to be equally as important as academic success.

Peer Influences

Japan. Peer groups are generally considered to have a positive influence on the academic achievement of Japanese students by fostering cooperation and friendly competition. Despite the intense pressure to obtain a good score on the college entrance examinations, there is not a strong sense of competition with friends and classmates. Competition can remain friendly because they are competing not only with their schoolmates, but also with a large pool of applicants from the region.

Only rarely did students suggest that friends or peers have a negative influence by discouraging them from doing their homework, studying, or attending school. An indirect type of negative influence on students' performance is bullying (*ijime*) by their peers. *Ijime* is hard to define and students gave a number of definitions: rough play, name calling, taking possessions, and physical violence. Students who are the target of bullying may be so humiliated or frightened that they are reluctant to remain in school or appear in the presence of their tormentors. Japanese educators and the general public regard *ijime* as one of the major problems in the social life of schools, even though its prevalence has declined sharply during the past decade.

Germany. The influence of peer groups and friendships on German adolescents is affected by the organization of German schools. Secondary schools divide incoming students into groups of 25 to 30 students that may remain as a group until they graduate. The academic achievement of students who are members of an academically-oriented group benefit from the support of their group. On the other hand, a group that includes aggressive, disinterested students may exert a negative influence on its members. Students also may assume attributes that are considered to be characteristic of the type of school they attend. *Gymnasium* students think of themselves as "abstract" or "intellectual," while *Realschule* students often describe themselves as being "practical" or "artistic."

United States. Developing an identity is a major goal of adolescents in the United States. This process is aided by membership in peer groups that provide opportunities for adolescents to experiment with styles of dress, hairstyles, and musical tastes. Being a member of a group labeled "jocks" or "slackers" or being thought of as popular or average, and spending time with others who share common interests, gives students experience with different identities, both positive and negative.

Although highly capable students are present in a wide variety of peer groups, some groups provide support for scholastic achievement and others discourage academic pursuits. Close friends were mentioned by students as also having an important influence on school involvement. Many U.S. students said they faced a serious problem of balancing the conflict they felt between their personal academic goals and their desire to be accepted and liked by their peers.

Social Context

Japan. Although violence, drugs, and teenage pregnancy are not the problems in Japan that they are in the United States, Japanese students face other social issues. Gender, for example, remains an influence on Japanese students. As in the United States, Japanese teachers reported that girls are more likely to enroll in the humanities track and boys in the science track during their high school years. Also, teachers said that it is common for parents and teachers to recommend to girls that they enroll in a junior college and to boys that they try to gain admission to a university. One reason given for this practice was that Japanese girls anticipate graduating, working for a few years, and then settling into the life of nurturing wife and mother, while their male counterparts look forward to employment through their whole career. These characteristics are changing rapidly, but they still exert an important influence on the attitudes and behavior of Japanese adolescents.

Japanese students told us that their place of residence also influences their school life. Students residing in urban areas have better modes of transportation, a greater variety of secondary schools, and access to after-school support, such as *jukus*. Rural students have more limited access to these forms of assistance. This makes it difficult for them to compete as effectively as urban students for places in prestigious high schools and universities.

Germany. While acts of violence by adolescents may appear in the German media, we found no data, either in our observations in the schools or in our discussions with teachers, to suggest that violence is a serious problem in German secondary schools. Several teachers pointed out that the so-called racially-motivated violence was in fact due to other problems facing German adolescents today, such as unemployment, family problems, and feelings of disenfranchisement. In particular, students, parents, and teachers mentioned the negative effects that double-digit unemployment rates have had on students' outlook for school achievement and future employment.

Substance abuse and sexual involvement are problems that face today's German youth. As in the United States, pressures to use drugs and engage in sexual activity have increased and the increase is greater in some schools than in others. Drinking and smoking are also common among German youth.

United States. Adolescents in the United States encounter numerous social problems, not the least of which are violence and crime in some of their neighborhoods and schools. While some students mentioned that school is the only place they feel safe, others said they did not feel safe even at school. For students who must face gangs in their neighborhoods and schools, gang intimidation and violence produce ever-present feelings of insecurity. In our interviews, teachers in these schools often stated that students from the inner-city schools often worried more about surviving the walk home from school than they did about an upcoming test or completing a homework assignment.

Drugs, alcohol, and tobacco use are common among students in many schools, both affluent and disadvantaged (University of Michigan News and Information Services 1994). Not only the students using drugs are affected by this problem. Peer pressure for using drugs, drug-related crime, and parental drug abuse impinge on many students' lives. Poverty, teenage pregnancy, and family disintegration are other problems that place additional burdens on some of the students we met.

Differential funding levels for schools in different school districts also mean that students in affluent school districts have ready access to books, computers, and laboratories, while other schools struggle to provide their students with even the minimum materials and equipment necessary for secondary education.

Summary

School plays a central role in the lives of adolescents in all three countries. For students whose goal is a college education, doing well in school gains in importance as the time for college entrance or school-leaving examinations approaches. Doing well has strong implications also for students in Germany and Japan who seek apprenticeships after their graduation from high school. However, life at school is not limited to academic activities, but also provides opportunities for adolescents' social development. In Japan and the United States, schools organize many structured opportunities for social interaction. Perhaps the most important occur in the context of extracurricular activities organized by the schools. This is not the case in Germany, where extracurricular activities are rarely provided. Groups, such as sports clubs, are organized by the community rather than by the school.

Adolescents find the transition from elementary school to middle school to be difficult, not only because it involves a different curriculum, but also because it is accompanied by a change in the manner in which education is organized. This is most pronounced in Germany, where, beginning in the fifth grade, students are separated into different types of schools defined by their difficulty and type of curriculum. The separation of students into different schools occurs in Japan at the 10th grade, when college-bound students and vocationally oriented students are channeled into academic or vocational high schools. In the United States, separation does not usually occur according to type of school, but according to different tracks within all-purpose high schools (except, perhaps, in the case of magnet schools in the United States, where attendance is voluntary).

In high schools in all three countries, and in middle schools in Germany and Japan as well, life both in and out of school is strongly influenced by the examinations that determine the type of high school or status of the college to which the student will be admitted. In the United States, students take college entrance examinations, but the tests appear to have a more tangential relationship to the high school curriculum than is the case in Germany and Japan, where the examinations and the high school curriculum are closely interrelated.

Students in the three countries prepare for the examinations in different ways. The most prolonged preparation occurs in Japan, where students spend most of their senior year in high school studying for the examinations on their own and through special classes offered at school and at private academies (*juku*). In the United States, preparation for the college entrance examinations is more casual. Students, knowing that other factors than their scores on the examination are also important in determining admission to college, generally allocate little time to preparing for the examinations. Because the German examinations are directly tied to a small number of their high school courses, German students do not find it necessary to spend as much time studying as Japanese students, but they do find it necessary to prepare more thoroughly than U.S. students.

In general, the amount of time spent studying depends on the type of school or track in which the student is enrolled. German students in the *Gymnasium*, Japanese students in academic high schools, and U.S. students in advanced placement courses in college preparatory tracks spend the most time studying. Studying is not synonymous with homework in Japan and Germany, for although small amounts of homework are assigned, students are expected to review previous lessons and prepare for future lessons through self-directed study. Such expectations seldom exist in U.S. high schools, where studying is typically directed by the need to prepare for tests or to complete assignments defined by the teacher.

The motivation of students to work hard during high school varies greatly, depending on their perception of the relevance of their courses for their future careers, the quality of teaching, and the respect they have for their teachers. Generally, as the relevance of their education becomes less clear or as they struggle to meet the required standards of the curriculum, students' enthusiasm for school diminishes, particularly at the secondary level when the curriculum becomes more difficult.

Students' motivation to spend time studying is also influenced by their interactions with peers, dating, and part-time work. As students progress through successive years in school, parents tend to become less and less directly involved in their children's' education. Providing a supportive environment, access to after-school help, and books and other study aids are the main expressions of this interest in all three countries. Personally helping their children becomes less likely as the difficulty of the curriculum increases and as the opportunities for interactions among members of the family become less frequent. As a consequence, adolescents in all three countries become increasingly dependent upon their peers.

Dating is a frequent type of social interaction among adolescents in the United States, but is less common in Japan and Germany. Similarly, a high percentage of students hold part-time jobs in the United States, where the independence gained from being partially self-supporting is highly prized. Parents in Germany and Japan do not want their children to work in part-time jobs; they expect that their children's free time will be spent studying or in social interactions.

Adolescence as a transitional period is expressed differently in the three countries. For Americans, it is perceived as a period of preparation for the future in terms of jobs and education, but it is also a period of individuation, establishing close relations with peers and members of the opposite sex, beginning employment, and gaining increased separation from parents. This is less the case in Japan, where these activities are more likely to occur at a later age and where parent-child dependence continues through and beyond high school. German adolescents follow neither path. Reliance is placed on the community rather than school for social experiences, and the locale for social interactions is more likely to be bars and cafes than school clubs and after-school study sessions.

Although the role of school in the lives of adolescents is great, they are increasingly influenced by the adult world that they are preparing to enter. Most adolescents in all three societies appear to make healthy adaptations to the complexity of modern societies; however, the disorganization of family life, the uncertainties of employment, and the changing standards for appropriate conduct pose important obstacles for most adolescents and are so difficult for some that they drop out of society rather than continue their efforts to adapt.

Chapter 5

The Training and Daily Lives of Teachers

"We as teachers are forced to be educators, parents, also counselors — I mean absolutely everything."

(Teacher in U.S.)

"During the daytime you're supposed to teach your course, and then after school and in the evening, on your own for the most part, you're supposed to devise new and great things. And during the summer, you have to want to do it on your own, and you have to get people together. And if you're doing it for free, nobody particularly wants to."

(Teacher in U.S.)

"I do not think that some people are born to be good teachers. Instead, I think that teachers have to like people, and be willing to learn and improve effective teaching techniques."

(Teacher in Germany)

"I do not mind having visitors in my class, but colleagues should not evaluate me personally or my teaching style. I do not want to open myself to other teachers because they could use my openness to talk about me in a bad way."

(Teacher in Germany)

"During my first year, I was always told by various older teachers about the correct way to write on the chalkboard. For example, first always write the purpose — what we will be studying. That kind of idea, for me now and for a lot of teachers is a really important device to use."

(Teacher in Japan)

"It's important for students to think. I know that if I explain what's in the textbook, nearly all students in this school will understand. But if I do that, much of their attention and energy will be spent on simply memorizing my explanation. I don't think this is desirable. Instead, I will present them with a question and first ask them to write down whatever comes across their minds, and start from there, so that they actually have to think in order to come up with a solution.

(Teacher in Japan)

The central figure in all education is the teacher. Countries whose students do well in international comparative studies are likely to applaud their country's teachers. Similarly, when a nation's students perform less effectively, one of the public's first reactions is to blame the teachers.

While the quality of teaching is clearly an important basis for students' academic achievement, there are many other factors that influence teachers' effectiveness and the consequent levels of achievement of their students. For example, societies differ widely in the degree to which teachers are esteemed and to which teaching is viewed as a critical profession for the society's welfare and progress. One measure of esteem is the financial support available for teachers' salaries. Salaries certainly influence the decision to become teachers and to remain teachers (see table 10).

We focused our attention in this study on the professional lives of teachers and the environments in which they work. In our interviews, conversations, and observations of teachers and in our discussions with parents and education authorities we looked for insights into teachers' status in society, their feelings about becoming a teacher, their professional competencies and personal ambitions, their everyday physical and social environments, their role in school administration, and the opportunities that exist for their collegial interaction and cooperation.

Discussion of these topics is grouped into five major sections. The first deals with the path to becoming a teacher and we follow the aspiring teacher through the college and pre-college years. Next, we consider attitudes about being a teacher. Following this, we present teachers' views about education practices; next we describe a typical day for teachers in each country and then discuss teaching practices. The chapter ends with a discussion of the administration within schools and how this administration influences teachers' daily responsibilities.

Table 10—Teachers' compensation packages

Japan	Germany	United States
National pay scale.	Civil servant pay scale in former West German states, separate pay scale for teachers in former East German states.	District pay scales.
Salary based on level of school, type of position, level of responsibility, years of teaching experience.	Civil servant pay scale based on years of education required. Pay increases with years of service.	Salary determined by degree attained, years of teaching experience, and location.
Merit-based raises not applicable.	Merit-based raises not applicable.	Merit-based raises adopted in some districts.
Bonuses twice a year.	Christmas bonus.	No bonuses.
Allowances for family composition, remote area, special services, vocational education, end of year, and extreme climate.	Allowance for households, based on marital status and family size. Usually 30-35 percent of base salary.	No bonuses.
Benefits: medical, retirement, vacation, housing, investment plan, low-interest loans.	Benefits: medical, retirement, vacation, dental.	Benefits: medical, retirement, vacation, dental, life insurance.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994-95.

Becoming a Teacher

Persons aspiring to become teachers in Japan, Germany, and the United States follow very different routes to attain their goal. The individuals we interviewed described differences in many dimensions, including the role of university training, practice teaching, professional examinations, the mentoring given to novice teachers, and in-service training. Table 11 provides a brief comparison of the education and training required to become a teacher in Japan, Germany, and the United States.

Table 11—Comparison of teacher training requirements

Japan	Germany	United States
• 4 years at teachers' college or university. • 3-4 weeks practice teaching.	• 4-5 years at university. • 2 years practice teaching.	• 4 years at university. • 1 semester practice teaching.
• Prefectural certification exam.	• First State exam.	• State certification exam.
• New teachers receive 1 year of in-school training under mentor and supplemental training in resource centers.	• Second State exam.	• Certification may be contingent on evaluation of first year of classroom work.

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994-95.

Japan. With rare exceptions, a bachelor's degree is required for teaching at all grade levels except kindergarten, where a two-year degree may be sufficient. Elementary school teachers are likely to have graduated from a teachers' university, but the majority of the high school teachers receive their bachelors degree from regular universities (Shimizu et al. 1993). Public school teachers rarely study for advanced degrees.

Those who seek to be a teacher must take education courses and choose an academic area in which to specialize. The teachers we spoke to also indicated that during the four-year undergraduate program, the teacher-in-training visits schools, writes lesson plans, and eventually spends from two to four weeks in closely supervised student teaching. Women constitute approximately 60 percent of elementary school teachers, but positions at successive grade levels are increasingly held by men (Shimizu et al. 1993).

Following college, aspiring teachers must take the difficult teacher qualification examination administered at the prefecture level. Those who pass the examination are certified as elementary and middle school or high school teachers. The large number of certified teachers seeking positions makes this a highly competitive profession.

Those who find a teaching position are assigned a mentor teacher who works with them throughout their first year. The mentor, a master teacher who is given a reduced teaching load for taking on these additional responsibilities, visits the new teacher's classroom frequently and then discusses the strengths and weaknesses of the practices that were observed. In addition to the guidance provided by the mentor, the new teacher is also expected to visit a teachers' resource center a certain number of days each week. Resource centers are staffed by experienced teachers who lead seminars. They contain teaching materials, lesson plans, teachers' magazines, and reference books to help the new teacher construct interesting, relevant lessons.

The Japanese approach to professional training and continuing education for teachers relies heavily on settings involving skilled teachers—primarily schools and resource centers—rather than on university classrooms. This approach continues throughout the teachers' career. In fact, after their 5th and 10th years of teaching, teachers must return to the resource center to participate in workshops, seminars, classroom observations, and study. Rather than depending on administrators in their own schools or on university professors whose experiences in elementary or secondary classrooms may have ended some years earlier, teachers are expected to learn from each other. This occurs through discussions during grade level and subject oriented committee meetings, observations of new teaching methods, and informal conversations. These approaches form the Japanese response to a need voiced by teachers in all three countries. The need, according to these teachers, is for obtaining help in solving day-to-day problems, rather than for receiving further exposure to theories of education and to the philosophy and history of education.

Another need commonly expressed by Japanese teachers and principals was for opportunities for teachers to be well-rounded persons with experience in the everyday world. According to one of the principals, "Whatever the teacher teaches, they must demonstrate a broad knowledge of contemporary society." The acquisition of such information is fostered, among other ways, through overnight outings with other teachers, *Monbusho*-sponsored cruises (in which several thousand teachers each year tour the Japanese islands and visit cultural and educational sites), and trips overseas to observe the cultures and teaching practices of other countries. Teachers may also be appointed as researchers, which makes it possible for a select group of teachers to make visits to cultural and educational settings in other regions of Japan. These formal mechanisms for broadening teachers' experiences are supplemented by volunteer study groups in which discussions are held on topics such as textbooks, teaching methods, lesson plans, and new curricula.

Germany. Each of the 16 German states handles its own program of teacher training, but the Conference of Ministers of Education from all the German states establishes the fundamental requirements for becoming a teacher. After completing 4 or 5 years of university study that includes several weeks of observation in a school, teachers-in-training must take the First State exam. Those who pass the examination must complete a 24-month assignment as a student teacher. This requirement is consistent with the common German requirement of 2 years of apprenticeship prior to obtaining a license in any trade or profession. Student teaching involves observation of classrooms, teaching with the assistance of a mentor, and, finally, being in charge of the classroom. As in Japan, mentors are skilled teachers, but unlike the practice in Japan, they are not given reduced teaching assignments during the time they work with practice teachers. Practice teachers are also observed regularly by their seminar teachers. The general consensus seems to be that the 2 years of practice teaching, for which the trainees are paid half of their first regular year's salary, is extremely valuable, but also very stressful.

After the two-year period of practical training is completed, teachers-in-training must pass the Second State Examination. They are then qualified to seek a regular appointment as a teacher. Performance on the Second State Examination is evaluated on the basis of grades given for practice teaching, a thesis in one of two major subjects, written lesson plans, and oral examinations in all major subjects. Teachers in fields such as physical education, art, and music, or in technical fields may also have to take a practical examination. Because of the need for vocational teachers, some deviation from this set of requirements is allowed for qualified people from business or industry who may be recruited directly into teacher training.

Because German universities are large and crowded, a question is often raised about the adequacy of the university education received by teachers, both in their liberal arts and education courses. The teachers we interviewed criticized education courses primarily because of their overemphasis on theory and their relative lack of experience in practical application. On the other hand, *Gymnasium* teachers, who regard themselves as subject specialists, complained that their required courses in education were of little value to them.

Certification is for a particular level of school, such as the *Gymnasium* or *Hauptschule*. This makes it difficult for teachers in crowded fields to switch readily to a type of school in which there is less competition for positions. At present, for example, secondary teachers face a difficult job market, but *Grundschule* teachers are in demand.

New teachers are given full responsibility for their classes. This ensures that they will have a high degree of independence, but the lack of support system is considered a major contributor to burnout and early retirement of German teachers. Teachers are usually on probation for 3 years before they can be appointed as civil servants with tenure. The decision for awarding this status is based primarily on the observation of classroom teaching by the school principal and by assessment of the teacher's lesson plans. Once they become civil servants, their salaries are determined by a prescribed set of yearly increases and it is nearly impossible to change their employment status.

Continuing education occurs primarily through attendance at state-sponsored university courses and presentations by experts, an approach that differs radically from the school-based peer-centered continuing education programs in Japan. Participation in the continuing education courses in Germany is up to the teacher and is quite variable. Even when participation is seemingly obligatory, the teacher has the choice of courses in which to enroll.

United States. The formal aspects of teacher training in the United States occur primarily in university classrooms. Individuals aspiring to become elementary school teachers typically enroll in a liberal arts program for the first 2 years of their college training and then transfer to a department or college of education to complete their undergraduate program. Some complete a major or minor in the subjects they expect to teach. Others, especially those planning to become elementary school teachers, have only a minimal number of courses in the subjects for which they will be responsible (USDE 1993b).

Students preparing to be secondary school teachers generally specialize in one academic discipline, such as mathematics, and take a limited number of courses in education. Typically, teachers-in-training spend one semester in a school during their senior year working as a student teacher.

These are the most common paths, but, as is the case in most aspects of the United States education system, other paths are also available. Some individuals aspiring to become certified teachers spend their days teaching or working at another job and take their education courses during evenings, weekends, and holidays. Others complete a four-year major in a liberal arts field and then remain in the university for an additional year during which they complete their required courses in education.

An effort is made to control the quality of teachers' education programs, and therefore the quality of teachers graduating from these programs, primarily through state licensing and certification procedures. There is a greater emphasis on credentialing than on evaluating the individuals' mastery of the subject and of techniques for effective teaching. Nevertheless, most states also require prospective teachers to pass some type of competency test before they can receive a teaching certificate and be hired by a school district.

Teachers are required to attend in-service training programs, usually held at their school or in the school district, as well as mini-courses that fulfill continuing education requirements. Credits from these workshops and in-service training programs are necessary in order to maintain certification. These programs tend to be relatively brief in length and cover a diverse array of topics; ranging from suicide prevention to brain functions and curriculum development. Teachers expressed enthusiasm about acquiring information from these sources but often said that the topics were chosen haphazardly and were not necessarily organized with the teachers' greatest needs in mind. The kinds of courses for which they expressed the greatest interest were those dealing with computers, writing, core subjects in elementary school, and teaching methods.

Attitudes about Being a Teacher

Some characteristics of teachers are similar in all three countries, such as the reason they become teachers. When we asked teachers about why they became a teacher, the most frequent reply was the desire to work with children and adolescents. One Japanese teacher gave a vivid description of his motivation for becoming an elementary school teacher:

> It is because elementary school children are very pure. Right? They don't know anything, you know. And teaching children who don't know anything—there is nothing more wonderful than that.

Teachers also said they liked the working hours, the extended vacation time and the security of a job that offers lifetime tenure or a secure appointment as a civil servant. High school teachers, to a greater degree than elementary school teachers, also chose a teaching career as an alternative to entering another profession or decided that becoming a teacher offered a more appealing life after having originally entered a different type of position. Table 12 summarizes the relative desirability of teaching as a profession in each of the three countries. Each factor is discussed in further detail in the following section.

Table 12—Factors indicating desirability of teaching profession

Factor	Japan	Germany	United States
Competition to enter teaching profession	High	High	Varies by location
Salary, bonus, benefits	Above average	Above average	Varies by location
Occupational status	Above average	Civil servant: Varies by type of school	Average to low

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994-95.

Negative aspects of teaching mentioned by teachers in all three countries revolved around their constant struggle to keep up to date. Teachers said they felt ill-prepared by their professional training to meet the requirements of teaching so much that is new, whether it is the latest computer technology or the most recent advances in mathematics and physics. In responding to this need, schools have made efforts to provide teachers with increased access to in-service training.

Teachers described an increase in dissatisfaction with the teaching profession, for which they offered three explanations. First, individuals training to become teachers are not necessarily able to find a teaching job. Because teaching is considered to be a secure position there has been an increase in the number of persons who would like to become teachers. As a result, the competition for most available positions has become intense. Second, teachers have been assigned added responsibilities that many consider to have little to do with the profession for which they have been trained. A third source of dissatisfaction is the belief that an increasing number of families abdicate some of the responsibilities for child rearing and expect that teachers will assume them.

There are major differences, however, in the status, salaries, and other aspects of the teaching profession in the three countries, as are described in the following sections.

Japan. Entering the teaching profession rather than a position in industry and commerce in Japan does not mean that the individual will suffer, either economically or in terms of social status. Teachers' incomes are competitive with those in other professions requiring similar amounts of training. As is common in many professions, their basic yearlong salary is supplemented by bonuses equivalent to up to 5 months salary and by allowances for certain personal and professional expenses. Nor is there a wide disparity between the salaries of university professors and public school teachers, reflecting the importance given to teaching at all levels of education. Salaries are based on the length of service to the school district.

In terms of prestige, the Japanese term for teacher (*sensei*) still carries an aura of authority and status that is accorded to skilled, experienced professionals. Despite this, teachers in Japan complain that the status of teachers has declined in recent years.

Germany. Salaries of teachers are comparable to those obtained in other civil servant positions requiring a comparable number of years of education. As civil servants they also receive other benefits such as household supplements, health care, and paid vacation time. Increases in salaries are determined by civil service regulations and there are few opportunities for promotion. Some teachers do become administrators with an appropriate increase in salary, but they continue teaching for several hours a week in order to maintain a collegial relationship with other teachers in the school. Teachers are permitted 12 years of unpaid leave, thereby making teaching a desirable profession for persons, such as mothers, who must juggle family life with work.

There is worry among teachers that the status of teachers in German society is declining. Regardless of whether this is the case, there is a clear hierarchy in the prestige of teachers in the various types of schools. At the top are *Gymnasium* teachers, followed by those who teach in *Realschule* and *Gesamtschule*. Lowest in the hierarchy are the *Grundschule* and *Hauptschule* teachers.

Teachers in the *Gymnasium* may have a Ph.D. degree and generally refer to themselves as mathematicians, historians, or physicists, for example, rather than as schoolteachers. Whether or not *Gymnasium* teachers have obtained the Ph.D., they give greater attention to their training in academic subjects than do teachers in the other types of schools. In fact, some *Realschule* and *Hauptschule* teachers told us that they chose to teach in these schools because they did not want to spend as much time pursuing the advanced study of academic subjects as would be necessary if they were to teach in a *Gymnasium.*

Teachers had numerous complaints and suggestions about the teaching profession as it exists in Germany today. There is a need, they suggested, for more interaction among teachers and more frequent contact between teachers and parents. They are concerned about the lowering of standards in the education system, which they interpret as being due to the influx of foreign workers' families and to the growing number of students who gain admission to a *Gymnasium.*

One aspect of teaching that is not found in Japan or the United States is the close contact that *Grundschule* teachers have with parents at the end of fourth grade. This is the time when parents must make the critical decision regarding the type of school their child should attend the following year. Parents rely strongly on the teachers' recommendations because they generally believe that teachers are better informed about the child's strengths and weaknesses than are the parents themselves. Discussing the basis of their recommendations with parents is a time-consuming task for *Grundschule* teachers.

United States. There are no national or state-sponsored salary scales. Teachers with a bachelors degree receive the lowest salaries; salaries of those with a masters degree are somewhat higher; and those who have both a masters degree and 30 academic credits receive the highest compensation. It is not surprising to find at both the elementary and secondary levels a teacher who holds a doctoral degree, nearly always in education. Because of their low salaries, many teachers seek other types of employment to supplement their income, a practice that is prohibited by teachers' contracts in Japan. Many high school teachers supplement their teaching salary by supervising extracurricular activities.

In addition to their salaries, U.S. teachers are nearly always provided with health and life insurance and participation in a retirement program. Negotiations about these matters, as well as about such things as class size, preparation time, and lunch duty, occur between the teachers' unions and the school district's administrative officers.

Teachers gain tenure in a school district after several years of successful performance and are likely to remain in the same school district in which they gained tenure. Because mobility of teachers is not great, teachers may, in fact, remain in the same school, teaching the same grade, throughout their teaching careers. This is not an uncommon practice in Germany, but in Japan all teachers must change schools and grades systematically. Teachers, as well as principals, move to a new school after 6 or 7 years. Moreover, because they remain with the same pupils for at least 2 years, they seldom teach the same grade for more than a single year.

The major complaints of U.S. teachers were the overscheduling of their time, with at least five classes a day and inadequate time to prepare for them, the lack of involvement of many parents in their children's education, the constantly changing curricula to which they must adapt, and the lack of respect that many parents and the general public hold for teachers and their contributions to American society.

When teachers were asked about the changes that were most greatly needed in U.S. schools, they came up with four: more flexible schedules, more opportunity to interact with each other, increased resources, and more assistance.

A Teachers' Day

Table 13 provides a summary of important aspects of the school day in terms of work environment and daily routine.

Table 13—Teachers' typical use of time

Time	Japan	Germany	United States
School days per year (approximate)	240	184	180
Begin school day	8:00 a.m.	7:30 a.m.	7:30 a.m.
Classes end	3:30 p.m.	12:00 or 1:30 p.m.	2:45 p.m.
End of day at school	4:00 p.m. or later	12:30 to 1:30 p.m.	4:00 p.m. or later
Do school work at home	Yes	Yes	Yes
Staff meetings:			
Daily	Yes	—	—
Weekly	Yes	—	Varies
Monthly	Yes	Yes	Yes
Supervise:			
Lunch	Daily in homeroom	—	Rotating
Playground	Rotating	Rotating	Rotating
Opportunity for collegial interaction:			
teachers' workroom,	Yes	Yes	No
lounge, hallways	Yes	Yes	Yes

SOURCE: Third International Mathematics and Science Study, Case Study Project, 1994–95.

The most common description teachers gave us about how they felt was exhaustion. Whether they remained at school all day or returned home early in the afternoon, the task of teaching young students at a time of increasing demands on teachers, the frequent introduction of new curricula, and the desire for fostering all-around development of students have led teachers to feel greatly overworked. Changes in family organization, a growing number of working mothers, and other social changes have meant that many of the tasks that were once handled by parents have now become the responsibility of teachers. The effects of these changes on teachers' daily lives are somewhat different in Japan, Germany, and the United States.

Japan. One stereotyped view of Japanese schools is that they are rigidly scheduled by a Ministry of Education that dictates, through its national curriculum, not only what will be taught but also when each specific topic will be covered. This inaccurate view depicts all fifth-grade teachers in Japan, for example, teaching the same topic at the same time on the same day. Teachers' days are not so rigidly scheduled, but vary throughout the week, with different patterns on different days and flexible starting and ending times for treating a topic. Classes are well organized and teachers attempt to remain on target, but there are occasions when events are of such importance that teachers feel free to depart from their lesson plans in order to interact with the children.

Elementary school teachers have a specialty, such as reading, mathematics, music, or physical education, but they usually are expected to teach all subjects. In junior high and high school the teachers are specialized. They teach, for example, classes in mathematics and possibly one other subject.

Teachers are expected to arrive at the elementary school around 8:00 in the morning and to leave no earlier than 4:00 or 5:00 in the afternoon. This means that most of the work of being a teacher, both the time spent actually teaching and the time spent in preparation of lessons, grading, and other activities, occurs at school. Elementary school teachers have many other duties, such as organizing outings for the class, gathering money for workbooks and test sheets, visiting students' homes, eating lunch with students, leading student clubs, and cleaning the school in cooperation with the students.

This arduous schedule is eased somewhat by the fact that teachers know the children very well. Elementary school teachers teach the same group of students for 2 or more years, and at the secondary level are responsible for a homeroom class that remains together until the 10th grade. Student-teacher interaction is further strengthened through excursions and field trips, and by teachers' strong efforts at finding out as much as possible about the children and their families through visits to their homes and conversations with their parents.

Schools are in session for around 240 days. These days are not all devoted to academic activities, for included in the 240 days is the time spent on field trips, sports day, the school fair, and other nonacademic functions. Teachers are also on duty throughout the summer except for short personal holidays, making it possible for much of their work in planning lessons and activities to be done during the summer months.

Teachers in secondary schools have a somewhat less demanding schedule in terms of hours of teaching, but they have other time-consuming obligations. Central among these is the need to prepare students for the entrance examinations for admission to high school and college. For this purpose they must cover the large number of topics found in the examination, hold special tutoring sessions, and counsel students about their prospects for gaining admission to various schools and universities. Teachers must also supervise student clubs, both those that are required and those that are voluntary.

One seldom sees an assistant in a Japanese classroom. Some science classes may have a laboratory helper, but for the most part, arrangements for demonstrations or experiments and all other teaching tasks must be done by the teacher. No substitute teachers are hired in Japan or in Germany when a teacher becomes ill. Instead, the principal or assistant principal may teach the class or arrangements may be made with teachers who have a free period to supervise the students' lessons.

Teachers at all grade levels said that they are asked to do too much and that they need better support. A middle school teacher told us: "It isn't good for people to work from 8:00 in the morning until late at night. Staying at school until 10:00 [p.m.] and going home to sleep—that really is a life only of school."

Teachers expect to retain their appointments until the time they retire. It is inevitable, however, that some teachers will be judged to be ineffective. When this occurs, efforts are made to help the teacher improve, but if this is not successful the teacher continues, we were told, to be "carried along. Like baggage."

Interactions among teachers are frequent. Large teachers' rooms, where all teachers have their desks and teaching materials, are found in all Japanese schools and serve, among other purposes, to provide teachers with easy access to each other. Interactions also occur incidentally in the halls between classes, on the playground, or after the school day is over. Teachers in the same school, like employees of Japanese firms, often get together during their holidays and free time at resorts, hot springs, and local coffee shops.

Germany. Teachers arrive between 7:30 and 8:00 a.m., and typically leave school before 1:00 or 1:30 in the afternoon. Secondary school teachers' schedules vary somewhat within the week, and they are able to leave the school, go shopping, or tend to other personal matters during their free periods. After-school interactions between students and teachers are infrequent since most schools in Germany do not offer extracurricular activities for students. Teachers customarily do not remain at school after the day's classes are over.

The school year is 184 days long and the teaching schedule ranges between 23 (*Gymnasium* and *Gesamtschule*) and 27 periods (*Grundschule*) a week. Out-of-class responsibilities of elementary school teachers include playground supervision, grade-level meetings with other teachers, monthly staff meetings, and communication with parents. Secondary school teachers must also assume the duties of being homeroom teachers, and must attend occasional school wide staff meetings, meetings with teachers of particular subjects, and meetings with parents. In addition, both elementary and secondary schoolteachers must substitute for colleagues who are absent. Teachers who take on career counseling duties have reduced teaching loads, as do teachers who are nearing retirement.

Because of their independence and a relative lack of committee work, German teachers find little need to cooperate with each other. There are brief interactions in the hall and short visits to the teachers' lounge between classes, but most teachers plan their lessons and grade students' papers after they return home.

Teachers repeatedly mentioned that changes in the population in Germany in recent years have increased the burdens placed on teachers. Accommodating the children of large numbers of foreign workers who do not speak German and who have little familiarity with German culture has increased the difficulty of teaching and classroom management.

United States. The school year in the United States is approximately 180 days long, and is broken up by a long summer vacation and shorter vacations in December and around the beginning of spring. Teachers are expected to arrive at school before classes begin every morning, usually before 8:00 a.m., and not to leave the school until the last classes are over. The length of school day varies a great deal from district to district, but generally the teaching day is long. Teachers seldom have fewer than four or five different classes each day and most teachers reported that they spend between 7.5 and 9 hours a day at school. In addition, teachers are expected to assume other duties, such as meeting the school buses, patrolling the halls, supervising the playground or cafeteria, or monitoring study periods.

Elementary school teachers typically teach all the major subjects, including mathematics, science, language arts, and social studies. In structuring their class day they must accommodate students who leave their classroom for activities such as gym class, music, or pull-out programs. Parents and other volunteers may be present in elementary school classrooms, helping children with reading or mathematics.

The teaching periods for secondary school teachers are generally of equal length, and are usually less than an hour long. Teachers at junior high schools tend to work in teams that teach certain groups of students and each member of the team specializes in teaching certain subjects. High school teachers work more independently. They often belong to departments, but their schedules are not coordinated with those of other teachers. Assistants are rarely encountered in secondary schools.

Teachers are responsible for setting up experiments in science classes, grading papers, counseling students, and handling numerous administrative chores necessary in a well-run school. Teachers are so busy during the school day that they generally have no opportunity to talk with each other about teaching practices or issues in education.

Teaching Practices

Japan. One teacher phrased the goal of Japanese teachers as "guiding students into being more fully developed human beings." In pursuit of this goal, teachers in Japan seek to promote the students' academic progress and social development. Academic progress is fostered through an interactive style of teaching that seeks to involve all students; social development is promoted by providing students with ample opportunities for social interaction during recesses, lunch, clubs, outings, and as members of small, heterogeneous groups of classmates.

During the elementary school years the pace of the lessons is slow, partly in order to be thorough and partly to allow all children time to understand the content of the lesson. Teachers intersperse their lessons with frequent thought-provoking questions. According to the teachers, a good question does not elicit a ready answer, but requires students to think. Attention of students is sustained partly because the lessons are well organized, because they know the teacher is likely to call upon them to answer questions or explain their answers, and partly because after every class period they are given opportunities for boisterous play.

Teachers profess to enjoy teaching children of all levels of academic ability, for they believe that it is through hearing different approaches that students come to understand what constitutes effective answers. Strong efforts are made by Japanese teachers to make lessons meaningful to children. This means that drill is minimized and that the day-to-day relevance of what has been learned is emphasized. Lessons are carefully planned, including the questions that will be asked, the examples that will be used, the sequence with which the material will be presented, and the kinds of information that will be conveyed through the medium of textbooks, worksheets, practice books, and notes on the chalkboard.

Junior high school is a time of transition from the interactive style of teaching that characterizes the elementary school to the greater content orientation of high school classes. Teachers know that they will be held responsible for providing the information required for the high school entrance examination and they feel pressure to cover all the material in all subjects. The recent elimination of classes on two Saturdays each month has increased this pressure, for although class time is decreased, the curriculum has not been lightened. Some of the students' burden of covering the material is relieved for those who attend *juku*. Instruction in *juku* closely follows the *Monbusho* curriculum and seeks to help students who have fallen behind in their studies.

At the same time, junior high and high school teachers face the difficult task of attempting to compensate in regular classes for the effects of differential attendance at *juku* by students in the class. Teachers find it difficult to prepare lessons that are equally challenging to those who have covered the material at *juku* and those who are encountering the material for the first time.

The pace of the lessons increases during high school and the teachers begin more and more often to assume the role of lecturer rather than that of guide. Because there is so much material to cover in the curriculum (and for the college entrance examinations), high school teachers suggest that they must proceed through the lessons rapidly and often report that they no longer have time to ensure that every student keeps up with the class in all the subjects.

Germany. Teachers said that the goals of education in Germany depend on the type of school being discussed. *Grundschule* teachers are likely to subscribe to the belief that their job is to promote children's intellectual and social development. Secondary school teachers, in contrast, seek to provide students with the broad base of knowledge that is necessary to prepare them for future careers. Teachers in a *Gymnasium* also face the specific task of preparing students so that their score on the *Abitur* examination will be sufficient for them to gain entrance into a university and to major in their chosen field of study. Vocational school (*Berufsschule*) teachers must keep abreast of what is happening in business and industry, for they attempt to teach their students the kinds of skills and knowledge that will be most helpful in finding employment.

Because the needs of students in the various types of schools differ, no single mode of teaching characterizes German education practice. All methods can be observed: lectures, interactive questioning between teacher and students, group work, and demonstrations. Most teachers adopt an eclectic style of teaching that incorporates several of these methods in each lesson. For instance, group work and peer tutoring are used more frequently by teachers in *Grundschule* and *Hauptschule* than by those in *Realschule*, but are rarely used in the upper levels of the *Gymnasium*. *Gymnasium* teachers focus on academic instruction though a lecture format. Their classes are fast paced and rather than attempting to stimulate thought, German teachers appear to be attempting to elicit the right answer. But they also attempt to incorporate class discussions and presentations by students into their classroom instruction and are facile in their ability to teach the concepts and skills they are seeking to impart to their pupils. Regardless of the level of the school, the teacher clearly is in charge of dispensing information.

United States. This is a time of great change in U.S. education, a time when the public is engaged in a serious debate about the unique value of the general purpose elementary and secondary schools that have characterized U.S. education. Under discussion are such topics as the utility of charter schools or academies, which serve special groups of students in special ways, the value of school choice, where parents may choose the type of school to which they send their child, and the contribution of different arrangements of public schools, including elementary schools, middle schools, junior high schools, and high schools with differing numbers of grades. It is also a time of argument about the subjects that should be taught and how they should be taught and about the utility and validity of certain types of courses. Each of these discussions is an expression of a different interpretation of the goals and purposes of schools.

Despite the questions that are being raised about education, most U.S. students still are receiving whole class instruction from a teacher who is in charge and who controls events in the classroom. Students are infrequently engaged in cooperative learning or group learning experiences. These approaches may characterize the practices in some schools, as do individualized instruction, hands-on experiences, and question-and-answer sessions, but the predominant mode of instruction is a sequence in which the teacher controls the interaction by asking questions, evaluating answers, and frequently providing the explanation as well. Judging from the schools we visited, changes in the goals of education do not appear to have led to widespread changes in the teaching that goes on in most public schools.

U.S. teachers are granted a great deal of autonomy within their own classrooms, but there is also a corresponding degree of control by state departments of education. In many states, the state curriculum guidelines define how much time teachers should spend each week teaching each of the primary subject areas. However, we found the decision about how to structure this time is generally left up to the teachers. Teachers in the same school may organize their lessons in markedly different fashions, but they know that their pupils will soon be taking the state competency tests. The tendency, therefore, according to teachers and principals is to modify preferred teaching practices to be sure that students will perform satisfactorily on the test. "Teaching to the test" has become a major worry in U.S. education, as it has in middle schools and high schools in Japan, for there is a tendency to give greater importance to a score on a single test than to a more thorough understanding of the material included in the curriculum.

School Administration

We asked teachers and administrators in each of the three countries about major influences on teachers, such as the relation between the teachers and the principal, the kinds of responsibilities delegated to teachers, and the manner in which these arrangements are carried out. Their answers revealed clear differences in the role of teachers in terms of the school's administrative structure, scheduling, and daily procedures.

Japan. Japanese schools are organized in a bottom-up fashion; that is, major administrative responsibility is held by the teachers, rather than by the principal. Because of this, the administrative structure within even the largest Japanese schools is very lean, usually consisting of a principal, vice principal, and head teacher. Because of the practice of rotating both the administrators and teachers from one school to another after no more than 6 or 7 years, neither teachers nor principals expect to remain at any school for a long period of time. It is difficult, therefore, for an administrator to establish firm personal control over a school. Adding to the diffusion of power is the fact that principals are recruited after successful careers as teachers, which means that most principals do not assume this position until quite late in their careers, and therefore have brief tenure in this position.

The major administrative tasks in Japanese schools are the responsibility of very extensive sets of committees. As a result, the role of principal departs from that found among its counterparts in the West. The principal is not the "boss," carrying responsibilities comparable to those of the head of a factory, but is a mediator in conflicts and is responsible for the smooth execution of decisions made by the various committees. All teachers, through their membership on committees, are forced to participate in the management of the school. Committees, such as the grade level and subject committees, may be devoted to broad areas of common concern. Or committees may have a more specific task, such as planning sports day or developing mechanisms for guiding students. This administrative structure establishes teamwork throughout the school, with individual teachers working with other teachers and groups of teachers working with the school's administrative staff.

Germany. Like Japan, Germany recruits its principals from among the ranks of the school's teachers. In fact, many principals continue to teach while they hold this administrative position, thereby strengthening the relation between teachers and the school's administration. The similarity between the organizational practices in the two countries ends there. German principals are less reliant on committees of teachers to help administer the schools than is the case in Japan; they therefore exercise greater top-down authority than Japanese principals. This is especially true among the newer schools; older schools with long traditions are not so likely to have top-down decisions made by the principal without full discussion and participation by teachers. Similarly, well-established teachers are less dependent on discussions with the principal about teaching practices than are younger teachers working in newer schools.

German teachers may remain at the same school, teaching the same subjects, for many years. This produces a culture of teachers in the older schools composed of persons who have known each other for long periods of time and who have come to share many common beliefs and practices. This is not the case in newer schools, where teachers and principals spend a great deal of time discussing academic matters, especially techniques of teaching.

In general, teachers are assigned few administrative duties and are seldom asked to perform ancillary services, further limiting their participation in activities outside their regular classrooms. The primary source of information about what other teachers are doing comes from the class book, where the teacher is obligated to record the subject, what was taught, and the homework assignments for each lesson. This class book serves as the primary mode of communication among teachers concerning what students have studied.

United States. What is characterized as a typical organization of U.S. schools can immediately be countered by an example showing a different type of organization. There are commonalties across schools in the United States, of course, but there are also great differences. We can describe the organization that we encountered most frequently.

Principals in the United States, compared to those in Japan and Germany, have a great deal of power over teachers. Governance of the school is primarily in the hands of the principal and even such matters as the teacher's lesson plans must be approved by the principal in many schools. The principal, usually a former teacher who has taken additional courses in education administration, assumes responsibility for determining the various activities undertaken by teachers and the amount of time allotted for these activities. We found that little power was granted to the teachers in the management of the school, except perhaps in such matters as choosing textbooks.

Typically each teacher in the U.S., both in elementary and secondary schools, is assigned a classroom and is thereby separated from other teachers. There are no teachers' rooms such as those that exist in Japan, and many schools lack the lounges found in the German schools. Instead, there are small, often multipurpose rooms where teachers can go for coffee during their free periods or between periods.

Summary

The special value of the case study method is evident in the study of teachers. By engaging teachers in relaxed conversations and discussions we were able to elicit candid responses to our inquiries about their lives and professional training. We talked with many teachers and visited many classrooms, and we believe that we were able to obtain reliable, representative descriptions of the motivations and experiences of teachers in the three countries.

Teachers in the three countries have very different conceptions of education, except in the broadest sense. They share a child-centered view during the elementary school years, when teaching is characterized by a relaxed approach and attention is paid to both the academic and social development of students. By the high school years, however, this approach is displaced by fact-filled, fast-paced lectures that are strongly influenced by the need to prepare students for secondary school and college entrance examinations.

Teachers find the heightened emphasis on such examinations to be among the most troublesome demands currently made of teachers in all three countries. Without an adequate score on the *Abitur* in Germany or on the college entrance examinations in Japan and United States, admission to a top-rated university is nearly impossible. Similarly, admission to a prestigious high school in Japan is extremely difficult without a sufficiently high score on the high school entrance examination. As a result of parental demands that their child be properly prepared for these examinations, teachers are forced to "teach to the test, " an action that they feel introduces distortions into the curriculum and, according to many teachers, substitutes memorization for understanding.

Teachers in the United States also differ in many ways from their colleagues in Japan and Germany. Teaching in the United States is conducted in an individualistic, isolated fashion. After completing undergraduate work in education and liberal arts and spending a term practice teaching, the new teacher is placed in complete charge of a classroom. In contrast, becoming a teacher in Japan is to engage in extensive interaction with other teachers throughout the teacher's career. Rather than relying primarily on university classes or practice teaching, Japanese teachers are expected to learn from each other on a daily basis throughout their career. In Germany, the acquisition of teaching skill is dependent upon a two-year apprenticeship, but unlike the extensive period of supervised training provided in Japan and Germany and the on-going opportunities for collegial cooperation in Japan, U.S. teachers have few opportunities to learn from or exchange information with their colleagues. This point has not escaped U.S. educators, who have expressed concern about teachers' failure to receive sufficient training in the management of the classroom and the structuring of lessons. Another point frequently mentioned was teachers' lack of mastery of subject matter in areas such as mathematics and science. Because of rapid advances in many areas of knowledge and their weak preparation in these areas as undergraduates, many teachers lamented their lack of preparation to teach some of these subjects, especially in elementary school.

It is not only in their training that U.S. teachers differ from their counterparts in Japan and Germany. Teachers in Japan follow a distinctive approach to teaching. In Japan, emphasis is placed in a mathematics class, for example, on presenting a practical problem in mathematics, eliciting different solutions from students, getting other students to evaluate the effectiveness of the solutions, and then bringing the lesson to a close by summarizing the lesson and stating the rules that govern the solutions to the problem. In Germany, teachers are less distinctive in their style of teaching, but the teacher, with a broad background in mathematics, is able to speak authoritatively and to respond readily to students' questions. U.S. teachers impressed us as being more eclectic in their approach to teaching, and as presenting their lessons with neither the high coherence of the Japanese lessons nor with the authoritative approach to mathematics evident in the German lessons.

The most salient picture that emerged from our discussions with teachers was that of persons who are dedicated to the teaching profession, but who, especially in the United States, are experiencing many frustrations and difficulties in their professional lives. The seriousness and frequency of problems were not the same in the other countries, but were roughly similar and equally disturbing to the teachers involved. U.S. teachers told us about their heavy teaching loads, insufficient time for preparation of lessons, concern about the adequacy of their professional training, their need to assume functions of child rearing formerly held by parents, families' lack of involvement in their children's education, the infusion of large numbers of immigrant children in the classrooms, and the need to adapt to ever changing curricula.

Attempting to respond to these demands has resulted in a high level of fatigue reported by teachers. Indeed, until serious efforts are made by policymakers and the general public to create more satisfying working conditions for teachers it seems likely that the precariousness of the teaching profession in terms of recruiting and retaining effective teachers is likely to increase.

A need for increased practical training was voiced by the teachers, both for themselves and for students. They criticized their own courses in education as being dominated by theories rather than application, and teachers profess the greatest need for techniques for handling everyday tasks.

After spending many weeks with the teachers in the three countries we were made to realize that the development of teachers and the improvement of teaching conditions pose very complex problems that simple answers will not solve. Teachers had little to say about the usefulness of extending the length of the school day or of the school year, of allowing parents to choose the school their child will attend, or of establishing charter schools. They focused, instead, on the importance of improving the qualifications and working environments of those who are ultimately responsible for students' education: the teachers.

Chapter 6

Conclusions

The education system of every country is embedded within the culture of that country. As a result of this close relationship one cannot hope to learn how education systems can be improved or academic achievement can be increased without understanding the actions, beliefs, and attitudes related to education that exist within the culture. We have tried to do this in the Case Study Project.

In this project we sought to gain, through intensive study of four major topics within three cultures, information about the cultural and social contexts for achievement which may help to explain why students in the United States should fare better or worse in international comparisons of achievement in mathematics and science than students in countries such as Japan and Germany. We approached this goal by obtaining information about the daily lives of students, parents, teachers, and policymakers and by exploring their beliefs and attitudes about learning and development. We believe that the findings may be sufficiently convincing to be considered as explanations; others may serve primarily as a fruitful source of hypotheses and suggestions for future exploration.

The Research Method

After analyzing the transcriptions of the interviews, conversations, and observations and reading the extensive field notes of the researchers, we believe that there are sufficient commonalties among the reports of the various researchers to constitute reliable descriptions of the conditions that exist within the three countries. They also serve to dispel stereotypes whose existence interferes with more appropriate understanding of the conditions within various countries.

We believe that we have avoided the concern that descriptive studies may lead to idiosyncratic conclusions by having a large team of researchers, all familiar with the culture in which they worked, spend a total of over 1,600 hours interacting with the respondents in interviews and conversations and in observing classrooms.

Concluding Remarks

We have attempted in this volume to report our main findings about the education systems and the practices, attitudes, and beliefs of the participants in the education of primary and secondary students in the three countries. From the discussions and observations that were conducted, it is obvious that there are both remarkable commonalties and striking differences among the three countries in many aspects of education. Our purpose has been to summarize the most salient features of the results presented in three country volumes which have resulted from this study (Ashwill & Nerison-Low 1998; Hofer 1998; LeTendre 1998).

This summary may offer tentative suggestions about ways in which we may gain a better understanding of the process of education in the United States, and of topics that merit further exploration and research. The study of countries that were high scorers on the TIMSS mathematics and science tests would be especially informative, as would case studies of schools within the United States that received the highest scores on the TIMSS tests.

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Glossary

Japanese Terms:

benkyo: study

Burakumin: Traditional lowest caste in Japan

gakuryoku: Acquired academic ability

hoshu: Supplementary lessons offered by school teachers

ijime: Bullying/teasing

juku: Cram school

kanji: Chinese characters used in Japanese writing system

Monbusho: Ministry of Education, Science, and Culture

renshu mondai: practice problems

sensei: teacher

shukudai: assigned homework

yobiko: preparatory school for University entrance exam

yoshu: reviewing class material

German Terms:

Abitur: The school-leaving exam and certificate of the Gymnasium. Consists of four semesters of classes and four final exams that cover material from those semesters.

Berufsschule (pl. Berufsschulen): Vocational high school, generally part-time.

Gesamtschule (pl. Gesamtschulen): Comprehensive school, grades 5–11 (5–13 in some cases) which are tracked only within some subjects.

Grundschule (pl. Grundschulen): Elementary school, grades 1–4.

Gymnasium (pl. Gymnasien): Academic high school, college-track education grades 5–13.

Hauptschule (pl. Hauptschulen): Lower-track secondary school, grades 5–9 (5–10 in some states).

Realschule (pl. Realschulen): Middle-track secondary school, grades 5–10.

Sonderschule (pl. Sonderschulen): Special, separate schools for learning disabled, behaviorally disturbed, mentally and physically disabled children.

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